dnorm(x, target_mu, target_sd)
dnorm(x, target_mu, target_sd)

Trace

Metropolis–Hastings
The image shows a statistical analysis with the following components:

1. **dnorm(x, target_mu, target_sd)**: This is likely a function or a probability density function, typically used in statistics to model a normal distribution. The parameters `target_mu` and `target_sd` are used to define the mean and standard deviation of the distribution.

2. **Trace**: This appears to be a trace plot, which is a common way to visualize the sampling process in Markov Chain Monte Carlo (MCMC) methods. The trace plot shows how a parameter of interest changes over iterations of the MCMC algorithm.

3. **Metropolis-Hastings**: The Metropolis-Hastings algorithm is a method for constructing a Markov chain that converges to a desired probability distribution. The plot likely demonstrates the acceptance rate or the behavior of the algorithm over iterations.

The diagram includes axes labeled `x` and `q`, with values ranging from `-3` to `3`. The graph visually represents the distribution of `x` given the `target_mu` and `target_sd`, the trajectory of the Markov chain over iterations, and the performance of the Metropolis-Hastings algorithm.
\texttt{dnorm(x, target\_mu, target\_sd)}

\begin{align*}
\text{Trace} & \\
\text{Metropolis–Hastings} & \\
\end{align*}
Plot of the function `dnorm(x, target_mu, target_sd)` with a trace and Metropolis-Hastings transitions.
\text{dnorm}(x, \text{target}_\mu, \text{target}_sd)

\begin{align*}
\text{Trace} \\
\text{Metropolis-Hastings}
\end{align*}
$dnorm(x, \text{target}_\mu, \text{target}_sd)$

Trace

Metropolis–Hastings

-3 -2 -1 0 1 2 3
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
The image shows a graphical representation of a normal distribution function, denoted as \( \text{dnorm}(x, \text{target}_\mu, \text{target}_{sd}) \). The graph illustrates the probability density function of a normal distribution with parameters \( \mu \) (mean) and \( \sigma \) (standard deviation). The x-axis represents the variable \( x \), and the y-axis represents the density of the distribution.

The trace plot below the density function shows the trajectory of the sampling process, indicating how the values of the variable evolve over iterations. The Metropolis-Hastings algorithm is used to generate samples from the posterior distribution, as indicated by the green marker which represents the final parameter estimate.

The x-axis is labeled with values from -3 to 3, and the y-axis is labeled with the density function and trace plot.
$dnorm(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis-Hastings
$$dnorm(x, \text{target}_\mu, \text{target}_sd)$$
$$dnorm(x, \text{target}_\mu, \text{target}_sd)$$

Trace

Metropolis-Hastings
$$dnorm(x, \text{target\_mu}, \text{target\_sd})$$
\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]
Metropolis–Hastings

\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]
The image contains a graph with three subplots. The top subplot shows a normal distribution curve labeled as `dnorm(x, target_mu, target_sd)` with a dashed line, indicating a standard normal distribution with a mean at 0 and a standard deviation at 1.

The middle subplot is labeled as `Trace` and displays a trace plot, which appears to represent the evolution of a parameter over iterations, likely from a Metropolis-Hastings algorithm.

The bottom subplot is labeled as `Metropolis-Hastings` and also shows a trace plot, similar to the middle subplot, indicating the sampling process of a Metropolis-Hastings algorithm.
\[ \text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma) \]

Trace

Metropolis-Hastings
$dnorm(x, \text{target}\_mu, \text{target}\_sd)$
The diagram illustrates the behavior of the Metropolis-Hastings algorithm in the context of a normal distribution. The top panel shows the probability density function (PDF) for a normal distribution with parameters \( \mu \) and \( \sigma \). The middle panel displays the trace of the samples generated by the Metropolis-Hastings algorithm, indicating the path taken through the parameter space. The bottom panel compares the generated samples with the target distribution, visualized by overlaying the Metropolis-Hastings trace with the PDF of the target distribution. The target distribution is represented by the red line, while the trace of the samples is shown in black, and the Metropolis-Hastings samples are indicated by the green dots.
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
```
dnorm(x, target_mu, target_sd)
```

Trace

Metropolis-Hastings
$\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis–Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis–Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis–Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis–Hastings
\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]
The graph shows a demonstration of the Metropolis-Hastings algorithm. The top panel illustrates the target distribution (red solid line) and the proposal distribution (blue dashed line). The middle panel displays the trace of the algorithm, indicating the sampled values over iterations. The bottom panel represents the Metropolis-Hastings distribution, which is a weighted average of the target and proposal distributions. The algorithm is designed to improve sampling efficiency by proposing moves that are more likely to be accepted, especially in regions where the target distribution is high.
\text{dnorm}(x, \text{target}_\mu, \text{target}_sd)
\[ \text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma) \]

Trace

Metropolis-Hastings
```R
dnorm(x, target_mu, target_sd)
```
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings
\textbf{Trace}
dnorm(x, target_mu, target_sd)
```
dnorm(x, target_mu, target_sd)
```
The image contains a series of graphs related to the Metropolis-Hastings algorithm. The graphs depict the density function (dnorm) and the trace of a parameter over its iterations. The x-axis represents the parameter values, and the y-axis represents the density function values. The trace graph shows the movement of the parameter over iterations, indicating a random walk process aimed at sampling from the posterior distribution. The Metropolis-Hastings algorithm is a Markov Chain Monte Carlo (MCMC) method used to construct a Markov chain that has the desired distribution as its equilibrium distribution. The algorithm works by proposing new values for the parameter and accepting or rejecting these proposals based on the Metropolis-Hastings acceptance ratio, which is influenced by the target distribution and the proposal distribution.
\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
$$\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})$$
\text{dnorm}(x, \text{target} \_\mu, \text{target} \_\text{sd})

-3 \quad -2 \quad -1 \quad 0 \quad 1 \quad 2 \quad 3

Trace

Metropolis–Hastings

-3 \quad -2 \quad -1 \quad 0 \quad 1 \quad 2 \quad 3
\texttt{dnorm(x, target\_mu, target\_sd)}
$dnorm(x, \text{target}\_\mu, \text{target}\_sd)$

Trace

Metropolis-Hastings
The image contains a graph with the following features:

- **Top Panel**: A plot labeled `dnorm(x, target_mu, target_sd)` showing a normal distribution curve.
- **Middle Panel**: A `Trace` plot indicating the trace of a Markov chain Monte Carlo (MCMC) simulation, with the chain appearing to explore the parameter space.
- **Bottom Panel**: A `Metropolis-Hastings` plot showing the acceptance ratio of the MCMC algorithm.

The x-axis ranges from -3 to 3, with specific points labeled at -2, -1, 1, and 2. The y-axis is not explicitly labeled in the image.
```r
dnorm(x, target_mu, target_sd)
```
dnorm(x, target_mu, target_sd)

Trace

Metropolis–Hastings
\[ \text{dnorm}(x, \text{target}_\mu, \text{target}_\text{sd}) \]
\begin{equation}
dnorm(x, \text{target}_\mu, \text{target}_\sigma)
\end{equation}
plot of \( \text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma) \)
$dnorm(x, target\_mu, target\_sd)$

Trace

Metropolis–Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

\texttt{Trace}

\texttt{Metropolis-Hastings}
\text{dnorm}(x, \text{target}\_\text{mu}, \text{target}\_\text{sd})

\text{Trace}

\text{Metropolis-Hastings}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
The image shows a trace plot and Metropolis-Hastings plots.

- The top plot represents the density function, `dnorm(x, target_mu, target_sd)`.
- The middle plot is a trace plot, likely showing the evolution of a parameter over iterations.
- The bottom plot depicts the Metropolis-Hastings acceptance ratio, indicating the movement of the chain towards the target distribution.
\texttt{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\textbf{Trace}

\textbf{Metropolis–Hastings}
\texttt{dnorm(x, target\_mu, target\_sd)}

\texttt{Trace}

\texttt{Metropolis-Hastings}
dnorm(x, target_mu, target_sd)
$d\text{norm}(x, \text{target\_mu}, \text{target\_sd})$
dnorm(x, target_mu, target_sd)

Trace

Metropolis–Hastings
The diagram shows a plot of the normal distribution function with different parameters. The top panel illustrates the probability density function of the normal distribution, with parameters specified as `dnorm(x, target_mu, target_sd)`. The middle panel displays a trace plot, which typically represents the evolution of a Markov chain Monte Carlo (MCMC) simulation. The bottom panel shows the Metropolis-Hastings algorithm in action, with the chain converging towards the target distribution. The x-axis represents the variable of interest, ranging from -3 to 3.
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
```
dnorm(x, target_mu, target_sd)
```

---

```
Metropolis-Hastings
```

---

```
Trace
```

---

```
Metropolis-Hastings
```

---

```
-3
-2
-1
0
1
2
3
```
dnorm(x, target_mu, target_sd)
\texttt{dnorm(x, target\_mu, target\_sd)}

\begin{itemize}
  \item Trace
  \item Metropolis-Hastings
\end{itemize}
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_\text{sd})

Trace

Metropolis–Hastings
\( \text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma) \)

Trace

Metropolis–Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis–Hastings}
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings
$dnorm(x, \text{target\_mu, target\_sd})$
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
$$dnorm(x, \text{target}_\mu, \text{target}\_sd)$$

Trace

Metropolis–Hastings
The image shows a graph with two distributions. The top panel represents the dnorm function with the target mu and target sd, denoted as $dnorm(x, \text{target}_\mu, \text{target}_\text{sd})$. The middle panel displays the trace of the Metropolis-Hastings algorithm, indicating the sequence of samples drawn from the target distribution. The bottom panel illustrates the Metropolis-Hastings distribution, showing how the proposal distribution is used to accept or reject new samples.
\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]
$dnorm(x, \text{target\_mu}, \text{target\_sd})$
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings

\(X\)
The diagram shows a plot of the density function of a normal distribution, `dnorm(x, target_mu, target_sd)`, with different parameterizations. The top panel displays the density function with a solid red line, while the dashed blue line represents a different parameterization. The middle panel is labeled "Trace" and shows a trajectory of points, possibly representing a Markov chain Monte Carlo (MCMC) simulation. The bottom panel, labeled "Metropolis–Hastings," illustrates the acceptance of moves in the MCMC process, with the dashed line indicating the proposed moves and the solid line showing the accepted moves.
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
$dnorm(x, \text{target}_\mu, \text{target}_\sigma)$

Trace

Metropolis–Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis–Hastings
$dnorm(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
$$d\text{norm}(x, \text{target\_mu}, \text{target\_sd})$$
A Metropolis-Hastings trace plot showing the evolution of a parameter over iterations, with the target distribution and the proposal distribution illustrated alongside.
\[ \text{dnorm}(x, \text{target}\_\mu, \text{target}\_sd) \]
The diagram illustrates the Metropolis-Hastings algorithm with the target distribution represented by a normal distribution (dashed blue line) and the proposal distribution (solid red line). The trace plot shows the sampled values over iterations, indicating the path taken by the algorithm to converge to the target distribution. The Metropolis-Hastings plot highlights the acceptance ratio of proposed moves, with the acceptance criterion shown as a green dot.
\texttt{dnorm(x, target\_mu, target\_sd)}

\texttt{Trace}

\texttt{Metropolis-Hastings}
\textbf{Metropolis–Hastings}

dnorm(x, target\_mu, target\_sd)

Trace

-3 -2 -1 0 1 2 3

Metropolis–Hastings

-3 -2 -1 0 1 2 3
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis-Hastings
$$dnorm(x, \text{target} \mu, \text{target} \sigma)$$

Trace

Metropolis–Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis–Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis–Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}
\texttt{dnorm(x, target\_mu, target\_sd)}
```r
dnorm(x, target_mu, target_sd)
```
\text{dnorm}(x, \text{target}_\mu, \text{target}_\text{sd})
dnorm(x, target_mu, target_sd)
\text{dnorm}(x, \text{target}_\mu, \text{target}_\text{sd})
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)

\text{Trace}

\text{Metropolis-Hastings}
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis–Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\begin{align*}
\text{Trace} \\
\text{Metropolis–Hastings}
\end{align*}
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
The diagram shows the distribution of a normal distribution (dnorm) with parameters `target_mu` and `target_sd`. The trace plot illustrates the Markov chain Monte Carlo (MCMC) samples over iterations, indicating convergence and mixing. The Metropolis-Hastings algorithm is used to generate these samples, adjusting the proposals based on the target distribution.

- **Trace**
  - The bottom trace plot shows a sequence of samples generated by the MCMC algorithm. The path of the samples is marked by a line, indicating how the samples evolve over iterations.

- **Metropolis-Hastings**
  - The bottom-right plot highlights the acceptance probabilities and the current and previous states of the chain, visualized in a histogram-like fashion.
The graph illustrates the Metropolis-Hastings algorithm with a target distribution shown as a solid red line and the proposal distribution as a dashed blue line. The trace of the Markov chain is displayed in the middle panel, showing how the chain moves through the parameter space. The Metropolis-Hastings acceptance ratio is visualized below, indicating the probability of accepting or rejecting proposed states based on the target distribution.
$dnorm(x, target\_mu, target\_sd)$

Trace

Metropolis−Hastings
\[ \text{dnorm}(x, \text{target}_\text{mu}, \text{target}_\text{sd}) \]
\[ \text{dnorm}(x, \text{target\_mu, target\_sd}) \]

**Trace**

**Metropolis–Hastings**
\texttt{dnorm(x, target\_mu, target\_sd)}

\begin{itemize}
  \item Trace
  \item Metropolis-Hastings
\end{itemize}
\[
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\]
\text{dnorm}(x, \text{target}_\mu, \text{target}_\text{sd})

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
$dnorm(x, \text{target\_mu}, \text{target\_sd})$

**Trace**

**Metropolis–Hastings**
The diagram shows the probability density function (PDF) of a normal distribution (dnorm(x, target_mu, target_sd)) and the corresponding trace plot and Metropolis-Hastings sample paths. The x-axis represents the target values, and the y-axis represents the probability density. The trace plot illustrates the evolution of the Markov chain over iterations, while the Metropolis-Hastings sample paths demonstrate the acceptance of proposed moves in the sampling process.
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
$dnorm(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis–Hastings
The image shows a graph with two normal distributions represented by dashed lines. The distributions are labeled as `dnorm(x, target_mu, target_sd)`.

The graph also includes a trace plot of a Metropolis-Hastings algorithm, showing the path of samples as a solid line. The trace plot spans across several iterations, indicating the random walk nature of the algorithm.

The horizontal axis represents the range from -3 to 3, with intervals marked at -3, -2, -1, 0, 1, 2, and 3. The vertical axis likely represents the probability density function or the value of the target function for the Metropolis-Hastings algorithm.
\texttt{dnorm(x, target\_mu, target\_sd)}
$$dnorm(x, \text{target\_mu}, \text{target\_sd})$$

Trace

Metropolis–Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)

\begin{align*}
\text{Trace} & , \\
\text{Metropolis–Hastings} &
\end{align*}
$dnorm(x, target_mu, target_sd)$

Trace

Metropolis–Hastings
plot of the density function dnorm(x, target_mu, target_sd)
\texttt{dnorm(x, target\_mu, target\_sd)}

\textbf{Trace}

\textbf{Metropolis–Hastings}
The image contains a graph with three panels. The top panel shows a density curve labeled `dnorm(x, target_mu, target_sd)` with two different distributions, one solid red line and one dashed blue line. The middle panel is a trace plot labeled `Trace`, showing a series of points that follow the path of a Markov chain. The bottom panel represents a Metropolis-Hastings algorithm, with a solid line indicating the acceptance of proposals and a dashed line showing the rejection of proposals. The x-axis ranges from -3 to 3.
$dnorm(x, \text{target}_\mu, \text{target}_sd)$

Trace

Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

\textbf{Trace}

\textbf{Metropolis–Hastings}
The image contains a graph with three panels. The top panel shows a normal distribution function labeled as $dnorm(x, target.mu, target.sd)$. The middle panel is a trace plot indicating the sampling process over iterations. The bottom panel represents the Metropolis-Hastings algorithm, illustrating the proposal distribution and the acceptance of proposals.
\texttt{dnorm(x, target\_mu, target\_sd)}

\begin{align*}
\text{Trace} & \\
\text{Metropolis–Hastings} &
\end{align*}
The image shows a graph with the title `dnorm(x, target_mu, target_sd)`. The graph appears to be a demonstration of the Metropolis-Hastings algorithm, with the trace of the random walk visible and the distribution of samples indicated by the dotted line. The axes are labeled with values ranging from -3 to 3.
\[ \text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma) \]
$dnorm(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis-Hastings
The diagram illustrates the Metropolis-Hastings algorithm. The trace plot shows the evolution of the parameter over iterations. The Metropolis-Hastings distribution is shown at different points, indicating the selection process. The target distribution is also depicted, highlighting how the algorithm draws samples from it efficiently.
$dnorm(x, \text{target.mu}, \text{target.sd})$

Trace

Metropolis-Hastings
Metropolis-Hastings
$d\text{norm}(x, \text{target}_\mu, \text{target}_\sigma)$

Trace

Metropolis–Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_s\text{d})
$$dnorm(x, \text{target}_\mu, \text{target}_sd)$$

Trace

Metropolis–Hastings
\text{dnorm}(x, \text{target}\_\mu, \text{target}\_\sigma)
$$\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})$$

Trace

Metropolis–Hastings
Metropolis-Hastings

Trace

dnorm(x, target_mu, target_sd)
\text{dnorm}(x, \text{target}\_\mu, \text{target}\_\text{sd})
\text{dnorm}(x, \text{target}_\mu, \text{target}_{sd})
\[ \text{dnorm}(x, \text{target}_\mu, \text{target}_\text{sd}) \]
The diagram shows the distribution of a variable $x$ with a normal density function $dnorm(x, target\_mu, target\_sd)$. The trace plot at the middle shows the evolution of the variable over time, with the Metropolis-Hastings algorithm's acceptance/rejection steps indicated by the vertical line at $\hat{x}$. The Metropolis-Hastings step is represented by the dashed line, showing how the sample is drawn from the target distribution.
\textbf{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
$$dnorm(x, \text{target}_\mu, \text{target}_\sigma)$$
\[ dnorm(x, \text{target}_\mu, \text{target}_\sigma) \]
dnorm(x, target_mu, target_sd)
The image contains a graph with three panels:

1. The top panel shows a normal distribution curve labeled `dnorm(x, target_mu, target_sd)`.
2. The middle panel depicts a trace plot labeled `Trace`.
3. The bottom panel illustrates a Metropolis-Hastings plot labeled `Metropolis-Hastings`.

The x-axis values range from -3 to 3.
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
```
dnorm(x, target_mu, target_sd)
```

Trace

Metropolis-Hastings
The image shows a graph with the following elements:

1. **Density Function**:
   - The top part of the graph displays a density function denoted as \( \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \).

2. **Trace Plot**:
   - Below the density function, there is a trace plot labeled as **Trace**.
   - The trace plot shows a series of points that track the evolution of a random variable over iterations, indicating the path taken by the Metropolis-Hastings algorithm.

3. **Metropolis-Hastings Sampling**:
   - The bottom part of the graph illustrates the Metropolis-Hastings sampling distribution, highlighting how samples are drawn from the target distribution.
   - The sampling path is marked with a dashed line, and the starting point is indicated by a green circle.

The graph effectively visualizes the process of sampling from a target distribution using the Metropolis-Hastings algorithm, demonstrating the transition of samples over iterations.
The figure illustrates the Metropolis-Hastings algorithm with a target distribution represented by the solid red line. The trace plot shows the samples generated by the algorithm, indicating the evolution of the Markov chain over iterations. The Metropolis-Hastings algorithm is used to draw samples from a probability distribution, in this case, the normal distribution with a specific mean and standard deviation. The algorithm accepts or rejects new samples based on a comparison of the target distribution and a proposal distribution, aiming to ensure the samples are drawn from the desired distribution efficiently.
\[ \text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma) \]
dnorm(x, target_mu, target_sd)

Trace: 

Metropolis-Hastings: 

-3  -2  -1  0  1  2  3
The diagram shows the density function of a normal distribution \( \text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma) \) with target mean \( \text{target}_\mu \) and target standard deviation \( \text{target}_\sigma \). The trace plot and Metropolis-Hastings output are also depicted, illustrating the sampling process and its convergence to the target distribution.
$dnorm(x, \text{target\_mu, target\_sd})$
dnorm(x, target_mu, target_sd)
\[ \text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma) \]
$dnorm(x, \text{target\_mu}, \text{target\_sd})$
The document contains a graph with the following elements:

- The graph is titled "dnorm(x, target_mu, target_sd)."
- The x-axis represents a range from -3 to 3.
- The y-axis represents the probability density function.
- The graph shows two normal distributions with different means and standard deviations.
- The title "Trace" is written above the graph, indicating that this is a trace plot.
- The title "Metropolis-Hastings" is written below the graph, indicating that this is a Metropolis-Hastings plot.

The graph visually represents the distribution of a random variable with a normal density function, illustrating the behavior of the Metropolis-Hastings algorithm.
The diagram illustrates a Metropolis-Hastings algorithm. The top graph shows the target density (solid red line) and the proposal density (dashed blue line). The middle graph represents the trace of the Markov chain, which is the sequence of sampled values. The bottom graph displays the Metropolis-Hasting proposal acceptance rate. The chain starts at a point marked by a green dot and moves through the parameter space, as indicated by the trace.
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

\texttt{Metropolis-Hastings}

\texttt{Trace}

\texttt{Metropolis-Hastings}
$dnorm(x, \text{target\_mu, target\_sd})$

Trace

Metropolis–Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
The graph shows the density of a normal distribution (dnorm(x, target_mu, target_sd)) with two different target mu values. The trace plot below the density graph displays the samples from the Metropolis-Hastings algorithm, illustrating the movement of the samples over iterations. The horizontal line at x = 0 represents the target distribution, and the trace plot shows how the algorithm samples from this distribution.
$dnorm(x, \text{target}_\mu, \text{target}_sd)$

Trace

Metropolis–Hastings
$dnorm(x, \text{target}_\mu, \text{target}_{sd})$

Trace

Metropolis–Hastings

-3 -2 -1 0 1 2 3

-3 -2 -1 0 1 2 3

-3 -2 -1 0 1 2 3
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
dnorm(x, target_mu, target_sd)
\[ dnorm(x, \text{target}_\mu, \text{target}_{sd}) \]
dnorm(x, target_mu, target_sd)
dnorm(x, target_mu, target_sd)

Trace

Metropolis–Hastings
Metropolis-Hastings

Trace

dnorm(x, target_mu, target_sd)
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
The diagram shows a normal distribution curve with a solid red line and a dashed blue line. The x-axis is labeled with values from -3 to 3, and the y-axis represents the density (dnorm(x, target_mu, target_sd)). The trace plot below the density curves shows a random walk path, indicating the sampling process of the Metropolis-Hastings algorithm. The Metropolis-Hastings distribution is represented by a dashed blue line in the lower part of the diagram. The green dot indicates a point sampled from the target distribution.
$$
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
$$

Trace

Metropolis–Hastings
The diagram illustrates the use of Metropolis-Hastings in statistical inference. The top panel shows the target distribution (solid red line) and the proposal distribution (dashed blue line). The middle panel is a trace plot, indicating the trajectory of the Markov chain samples, with the Metropolis-Hastings acceptance probability shown at the bottom. The horizontal axis represents the values of the parameter being estimated, possibly denoted as $x$, and the vertical axis shows the density of the posterior distribution. The trace plot demonstrates how the chain moves through the parameter space, attempting to match the target distribution. The Metropolis-Hastings algorithm is used to generate samples from the target distribution, with the chain's random walk illustrated by the jagged path. The acceptance probability, shown at the bottom, is a function of the Metropolis-Hastings ratio, which determines whether a proposed move is accepted or rejected, aiming to improve the sampling efficiency.
\text{dnorm}(x, \text{target}\_\text{mu}, \text{target}\_\text{sd})

\text{Trace}

\text{Metropolis-Hastings}
\textit{dnorm(x, target\_mu, target\_sd)}

\textbf{Trace}

\textbf{Metropolis–Hastings}
$\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)$
The diagram illustrates the function `dnorm(x, target_mu, target_sd)` with two different target distributions. The top graph shows the density function, while the bottom graph displays a trace plot, likely from a Metropolis-Hastings algorithm, indicating the sample path of the Markov chain over iterations.
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\begin{align*}
\text{Trace} \\
\text{Metropolis–Hastings}
\end{align*}
The diagram illustrates the Metropolis-Hastings algorithm, where `dnorm(x, target_mu, target_sd)` represents the probability density function of a normal distribution with mean `target_mu` and standard deviation `target_sd`. The trace plot shows the sampled values over iterations, highlighting the exploration of the parameter space and convergence to the target distribution.
$dnorm(x, \text{target}_\mu, \text{target}_sd)$
\text{dnorm}(x, \text{target \_mu}, \text{target \_sd})

\begin{align*}
\text{Trace} & \\
\text{Metropolis-Hastings} &
\end{align*}
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
\text{dnorm}(x, \text{target}\_\text{mu}, \text{target}\_\text{sd})

\text{Trace}

\text{Metropolis-Hastings}
\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
The diagram illustrates a distribution function and its corresponding trace and Metropolis-Hastings plots. The function is described as `dnorm(x, target_mu, target_sd)`, where `x` is the variable, `target_mu` is the mean, and `target_sd` is the standard deviation. The trace plot shows the sampled values over iterations, while the Metropolis-Hastings plot displays the acceptance and rejection of proposed moves in the sampling process.
$d\text{norm}(x, \text{target\_mu}, \text{target\_sd})$
\texttt{dnorm(x, target\_mu, target\_sd)}

**Trace**

**Metropolis-Hastings**
\( \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \)
The image shows a plot with the function $dnorm(x, \text{target}_\mu, \text{target}_\sigma)$ on the left axis. The graph is titled "Trace" and "Metropolis-Hastings". The x-axis ranges from -3 to 3, with labels at -3, -2, -1, 0, 1, 2, and 3.
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_{sd})
The image shows a graph with the function `dnorm(x, target_mu, target_sd)` plotted. The graph displays the density function of the normal distribution with specified means and standard deviations. The x-axis represents the range from -3 to 3, and the y-axis represents the density values. The graph includes two density curves, one solid and one dashed, indicating different distributions. The title `Trace` suggests that the graph might be part of a trace plot in Bayesian statistics, showing the evolution of a parameter over iterations in a Markov chain Monte Carlo (MCMC) simulation. The lower section labeled `Metropolis-Hastings` likely refers to the Metropolis-Hastings algorithm, a common method for generating samples from a probability distribution when direct sampling is difficult.
dnorm(x, target_mu, target_sd)

Trace

Metropolis–Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
The graph shows the trace plot of Metropolis–Hastings algorithm. The dotted blue line represents the trace of the random variable $x$, while the solid red line represents the target distribution $dnorm(x, \text{target\_mu}, \text{target\_sd})$. The trace plot displays the evolution of the random variable over iterations, illustrating how the algorithm converges to the target distribution.
\texttt{dnorm(x, target\_mu, target\_sd)}
$dnorm(x, \text{target}\_mu, \text{target}\_sd)$

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)

Metropolis-Hastings

Trace

-3  -2  -1  0  1  2  3
Trace

Metropolis-Hastings

dnorm(x, target_mu, target_sd)
$dnorm(x, \text{target}_\mu, \text{target}_sd)$

Trace

Metropolis-Hastings
Metropolis-Hastings

Trace

dnorm(x, target_mu, target_sd)
\texttt{dnorm(x, target\_mu, target\_sd)}
The diagram shows a density function of a normal distribution with mean \( \mu \) and standard deviation \( \sigma \), denoted as \( \text{dnorm}(x, \mu, \sigma) \). The trace plot illustrates the Markov Chain Monte Carlo (MCMC) sampling process, which aims to approximate the posterior distribution of the parameters. The Metropolis-Hastings algorithm is used to generate samples from the target distribution, as indicated by the vertical line marking the acceptance of a proposed sample.
\text{dnorm}(x, \text{target}_\mu, \text{target}_\text{sd})
dnorm(x, target_mu, target_sd)
\texttt{dnorm(x, target\_mu, target\_sd)}

\begin{align*}
\text{Trace} \\
\text{Metropolis-Hastings}
\end{align*}
\texttt{dnorm(x, target\_mu, target\_sd)}

\textbf{Trace}

\textbf{Metropolis-Hastings}
\texttt{dnorm(x, target\_mu, target\_sd)}

\textbf{Trace}

\textbf{Metropolis–Hastings}
Trace

Metropolis–Hastings
\text{n}(x, \text{target}_\mu, \text{target}_\text{sd})

-3 -2 -1 0 1 2 3

\text{Trace}

\text{Metropolis-Hastings}
\( \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \)
\text{dnorm}(x, \text{target} \mu, \text{target} \sigma_d)

\text{Trace}

\text{Metropolis-Hastings}
dnorm(x, target_mu, target_sd)

Trace

Metropolis–Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}
\text{dnorm}(x, \text{target}_\mu, \text{target}_sd)

Trace

Metropolis-Hastings

\begin{align*}
x & \quad -3 & -2 & -1 & 0 & 1 & 2 & 3 \\
\end{align*}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
dnorm(x, target_mu, target_sd)
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\texttt{dnorm(x, target_mu, target_sd)}

\textbf{Trace}

\textbf{Metropolis-Hastings}
The diagram shows a plot of the normal distribution function (dnorm(x, target_mu, target_sd)) along with a trace and Metropolis-Hastings output. The trace plot displays the random walk behavior of the Markov chain, while the Metropolis-Hastings output shows the acceptance probabilities.
The diagram shows the distribution of a normal random variable with parameters \( \mu \) and \( \sigma \). The solid line represents the target distribution, while the dashed line shows the proposal distribution generated by the Metropolis-Hastings algorithm. The trace plot illustrates the movement of the sampling process over the iterations, with the Metropolis-Hastings plot showing the acceptance of new samples.
\[ \text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma) \]
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
The image shows a graph with a normal distribution curve (dnorm) and a trace plot. The Metropolis-Hastings algorithm is demonstrated with a series of points forming a trace over several iterations. The x-axis ranges from -3 to 3, and the y-axis shows the probability density for a normal distribution with specific parameters.
\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]
$$dnorm(x, \text{target\_mu}, \text{target\_sd})$$
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis–Hastings
d\text{norm}(x, \text{target}_\mu, \text{target}_\sigma)

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_{sd})

\begin{figure}
\centering
\includegraphics[width=\textwidth]{figure.png}
\caption{Trace and Metropolis-Hastings diagrams for a normal distribution.}
\end{figure}
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3

x

-3 -2 -1 0 1 2 3
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\texttt{dnorm(x, target_mu, target_sd)}

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
\texttt{dnorm(x, target\_mu, target\_sd)}
$dnorm(x, \text{target}_\mu, \text{target}_sd)$

Trace

Metropolis–Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}
\texttt{dnorm(x, target\_mu, target\_sd)}

**Trace**

\texttt{Metropolis-Hastings}
The diagram illustrates the Metropolis-Hastings algorithm. The top panel shows the target distribution (solid red line) and the proposal distribution (dashed blue line). The middle panel is a trace plot of the sampler's trajectory, starting from an initial value (green dot) and moving through the parameter space. The bottom panel displays the Metropolis-Hastings acceptance ratio, indicating the probability of accepting a proposed move.
\texttt{dnorm(x, target\_mu, target\_sd)}

\texttt{Metropolis-Hastings}

\texttt{Trace}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
\texttt{dnorm(x, target\_mu, target\_sd)}
$dnorm(x, \text{target\_mu}, \text{target\_sd})$
\texttt{dnorm(x, target\_mu, target\_sd)}

\textbf{Trace}

\textbf{Metropolis–Hastings}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
Metropolis-Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\text{dnorm}(x, \text{target}_\mu, \text{target}_\text{sd})

\text{T}race

\text{Metropolis–Hastings}
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
The image contains a graph with three plots. The top plot shows a normal distribution curve labeled `dnorm(x, target_mu, target_sd)` with two overlapping curves. The middle plot is a trace plot, possibly representing Markov Chain Monte Carlo (MCMC) samples. The bottom plot seems to illustrate the Metropolis-Hastings algorithm, with a target distribution and a proposal distribution. The x-axis ranges from -3 to 3.
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}
\texttt{dnorm(x, target\_mu, target\_sd)}
$dnorm(x, \text{target}\_\text{mu}, \text{target}\_\text{sd})$

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis–Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]

Trace

Metropolis-Hastings
$\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target	extunderscore mu}, \text{target	extunderscore sd})
The diagram illustrates the Metropolis-Hastings algorithm. The top panel shows the target distribution (solid red line) and the proposal distribution (dashed blue line). The middle panel displays the trace of the Markov chain, which moves through the parameter space. The bottom panel presents the Metropolis-Hastings acceptance ratio for each step.
\texttt{dnorm(x, target\_mu, target\_sd)}

\textbf{Trace}

\textbf{Metropolis-Hastings}
$dnorm(x, target\_mu, target\_sd)$

$\text{Trace}$

$\text{Metropolis-Hastings}$

$x$
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\text{dnorm}(x, \text{target}\_\text{mu}, \text{target}\_\text{sd})

\begin{equation}
\end{equation}

\text{Trace}

\text{Metropolis–Hastings}
\text{dnorm}(x, \text{target}\_\mu, \text{target}\_sd)
$dnorm(x, \text{target}_\mu, \text{target}_sd)$

Trace

Metropolis–Hastings
$dnorm(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis-Hastings
$dnorm(x, \text{target}_\mu, \text{target}_\text{sd})$

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
dnorm(x, target_mu, target_sd)

Trace

Metropolis–Hastings
$d\text{norm}(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

\texttt{Trace}

\texttt{Metropolis-Hastings}
The diagram illustrates the Metropolis-Hastings algorithm applied to a target distribution. The top panel shows the target distribution, while the middle panel displays the trace of the Markov chain, indicating the path taken by the algorithm over iterations. The bottom panel compares the density of the target distribution (solid line) with the density of the samples generated by the algorithm (dashed line).
Metropolis–Hastings
$dnorm(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis–Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}
The diagram shows the distribution of a normal distribution with mean \( \mu \) and standard deviation \( \sigma \) (solid red line) compared to a normal distribution with a different mean and standard deviation (dashed blue line). The trace plot below the distribution shows the path taken by the Metropolis-Hastings algorithm in sampling from the posterior distribution. The Metropolis-Hastings algorithm is a Markov Chain Monte Carlo (MCMC) method used to obtain a sequence of samples from a probability distribution, which is often used for Bayesian inference. The algorithm works by proposing new samples and accepting them based on a probability criterion that ensures the samples come from the target distribution.
\texttt{dnorm(x, target\_mu, target\_sd)}

\textbf{Trace}

\textbf{Metropolis–Hastings}
The image contains a graph with the following components:

- **Dnorm(x, target_mu, target_sd)**: A normal distribution curve with a solid red line.
- **Trace**: A trace plot with a dashed blue line showing the sequence of values sampled from the distribution.
- **Metropolis-Hastings**: A Metropolis-Hastings chain indicated by a dashed blue line starting from a specific point and moving through the distribution.

The x-axis ranges from -3 to 3, with points marked at -3, -2, -1, 0, 1, 2, and 3. The y-axis represents the probability density for the normal distribution.
\texttt{dnorm(x, target\_mu, target\_sd)}
\text{dnorm}(x, \text{target}_\mu, \text{target}_{sd})

\text{Trace}

\text{Metropolis-Hastings}
\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
dnorm(x, target_mu, target_sd)
$\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})$
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis–Hastings
Metropolis-Hastings

Trace

dnorm(x, target_mu, target_sd)
$dnorm(x, \text{target}_{\mu}, \text{target}_{sd})$

Trace

Metropolis–Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
The graph shows the Metropolis-Hastings algorithm's trace and the target distribution. The red line represents the target distribution, while the blue dashed line shows the trace of the algorithm's samples. The x-axis is labeled with values ranging from -3 to 3, and the y-axis represents the probability density function (PDF) with labels 'dnorm(x, target_mu, target_sd)'. The green point indicates the starting point of the algorithm.
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis–Hastings
\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]
The image shows a plot with three different components:

1. **Probability Density Function (PDF)**: The top graph depicts a probability density function (PDF) with two curves. The solid red curve represents the target distribution, and the dashed blue curve represents the proposal distribution. The function is labeled `dnorm(x, target_mu, target_sd)`.

2. **Trace Plot**: The middle graph is a trace plot showing the samples drawn from the target distribution. The trace plot illustrates the sequence of values sampled during the Metropolis-Hastings algorithm.

3. **Metropolis-Hastings**: The bottom graph represents the Metropolis-Hastings algorithm, which is used to draw samples from a probability distribution. The plot shows the transition of the samples towards the target distribution over iterations.
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3
dnorm(x, target_mu, target_sd)
\text{dnorm}(x, \text{target}_\mu, \text{target}_sd)
\text{dnorm}(x, \text{target}_{\mu}, \text{target}_{sd})

\text{Trace}

\text{Metropolis-Hastings}
\[ dnorm(x, \text{target\_mu}, \text{target\_sd}) \]

Trace

Metropolis–Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
The diagram illustrates the transition densities for Metropolis-Hastings sampling. The top panel shows the target distribution (solid red line) and the proposal distribution (dashed blue line). The middle panel is a trace plot of the sampled values, where the path of the Markov chain is visible. The bottom panel displays the density plots for the initial and final distributions, with the Metropolis-Hastings acceptance probability indicated. The sampled values are marked by a vertical line. The function `dnorm(x, target_mu, target_sd)` is used to generate the target distribution.
$dnorm(x, target\_mu, target\_sd)$

Trace

Metropolis–Hastings

-3 -2 -1 0 1 2 3

-3 -2 -1 0 1 2 3
The image shows a graph with two normal distributions represented by solid and dashed lines. The x-axis ranges from -3 to 3, and the y-axis represents the density function with the parameters target_mu and target_sd. The trace plot below the graph shows the samples drawn from the distributions, indicating the Metropolis-Hastings algorithm's path through the parameter space.
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
The diagram illustrates the usage of the `dnorm` function in R, which generates a normal distribution. The function is defined as `dnorm(x, target_mu, target_sd)` where `x` is the vector of values, `target_mu` is the mean of the distribution, and `target_sd` is the standard deviation.
$$dnorm(x, \text{target\_mu}, \text{target\_sd})$$
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\begin{align*}
\text{Trace} \\
\text{Metropolis–Hastings}
\end{align*}
dnorm(x, target_mu, target_sd)
The diagram illustrates the Metropolis-Hastings algorithm. The top panel shows the target distribution (solid line) and the proposal distribution (dashed line). The middle panel displays the trace of the Markov chain over iterations. The bottom panel compares the distributions at different iterations, highlighting the chain's movement towards the target distribution.
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\begin{align*}
\text{Trace} \\
\text{Metropolis–Hastings}
\end{align*}
\[ \text{dnorm}(x, \text{target}\_\text{mu}, \text{target}\_\text{sd}) \]
The diagram shows a plot of the normal distribution function $dnorm(x, \text{target}_\mu, \text{target}_sd)$ in the top panel. The middle panel displays a trace plot, and the bottom panel illustrates the Metropolis-Hastings algorithm.
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
\texttt{dnorm(x, target\_mu, target\_sd)}

\textbf{Trace}

\textbf{Metropolis–Hastings}
$dnorm(x, \text{target}_\mu, \text{target}_\sigma)$

Trace

Metropolis–Hastings
The image shows a plot for the function `dnorm(x, target_mu, target_sd)` with the following axes:

- **X-axis:** The range is from -3 to 3.
- **Y-axis:** The distribution is positive.

The plot includes:
- **Normal Distributions:**
  - A solid red line represents the normal distribution with a mean of `target_mu` and standard deviation of `target_sd`.
  - A dashed blue line also represents a normal distribution with the same mean and standard deviation.

The graph is labeled as 'Trace' and 'Metropolis-Hastings' indicating the type of analysis or method being used to evaluate the normal distribution.
dnorm(x, target_mu, target_sd)

Trace

Metropolis–Hastings
\text{dnorm}(x, \text{target \_mu}, \text{target \_sd})
```r
dnorm(x, target_mu, target_sd)
```

**Trace**

**Metropolis-Hastings**
The diagram illustrates the Metropolis-Hastings algorithm with a target distribution represented by a red curve and the proposal distribution represented by a blue dashed line. The trace plot shows the path of samples drawn from the target distribution. The Metropolis-Hastings algorithm is used to generate samples from a complex distribution by proposing a new sample and accepting it based on a probability ratio that includes the ratio of the target and proposal densities.
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis–Hastings}
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings
Metropolis–Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)

\text{Trace}

\text{Metropolis-Hastings}
\text{dnorm}(x, \text{target}\_\mu, \text{target}\_sd)

\begin{align*}
\text{Trace} \\
\text{Metropolis–Hastings}
\end{align*}
```
dnorm(x, target_mu, target_sd)
```

**Trace**

**Metropolis-Hastings**
The image contains a graph with three plots. The top plot shows a function labeled `dnorm(x, target_mu, target_sd)` with a red and a blue dashed line. The middle plot is labeled `Trace` and shows a trace plot with a jagged line. The bottom plot is labeled `Metropolis-Hastings` and also shows a trace plot with a jagged line.
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
$$dnorm(x, \text{target}\_mu, \text{target}\_sd)$$

Trace

Metropolis–Hastings


-3 -2 -1 0 1 2 3

\text{dnorm}(x, \text{target}\_mu, \text{target}\_sd)
$dnorm(x, \text{target\_mu, target\_sd})$

Trace

Metropolis–Hastings
The figure illustrates the concept of Metropolis-Hastings algorithm. The top panel shows the target distribution (solid red line) and the proposal distribution (dashed blue line). The middle panel displays the trace of the Markov chain, indicating the path taken by the algorithm. The bottom panel compares the target distribution to the distribution of the chain.
The image shows a graph of a probability density function (PDF) generated by the `dnorm` function in R, which is used for the normal distribution. The PDF is plotted against a range of values on the x-axis, typically representing the range of possible values for a normally distributed variable.

The graph includes a trace plot, which is a visual representation of the Markov Chain Monte Carlo (MCMC) sampling process. The trace plot shows the path of samples drawn from the distribution across iterations, illustrating the convergence of the sampling process to the target distribution.

Additionally, there is a Metropolis-Hastings (M-H) acceptance rate plot, which provides information on the efficiency of the sampling process. The M-H algorithm is a method for generating samples from a probability distribution when direct sampling is difficult. The acceptance rate indicates how often proposed samples are accepted, with a higher rate generally indicating better efficiency.

Overall, the graph provides a comprehensive view of the sampling process and the distribution characteristics, offering insights into the statistical analysis and simulation results.
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\begin{align*}
\text{Trace} \\
\text{Metropolis–Hastings}
\end{align*}
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)

\begin{align*}
\text{Trace} & \\
\text{Metropolis–Hastings} &
\end{align*}
dnorm(x, target_mu, target_sd)
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\begin{align*}
\text{Trace} \\
\text{Metropolis-Hastings}
\end{align*}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\text{dnorm(x, target\_mu, target\_sd)}
The diagram shows a comparison of two distributions, likely related to the density function $d\text{norm}(x, \text{target}_\mu, \text{target}_\sigma)$.

The top panel displays a normal distribution curve, with the solid red line representing the target distribution and the dashed blue line possibly indicating a sampled distribution.

The middle panel is a trace plot, indicating the sampled values of a parameter, likely from a Metropolis-Hastings algorithm, given the label "Metropolis-Hastings." The trace plot shows how the sampled values evolve over iterations.

The bottom panel continues the trace plot, providing a visual representation of how the sampled values spread and converge around the target distribution. The vertical line marks a specific point of interest, possibly indicating a change or a threshold in the sampled values.
$dnorm(x, \text{target\_mu}, \text{target\_sd})$
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
$$dnorm(x, \text{target\_mu, target\_sd})$$
$dnorm(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3

-3 -2 -1 0 1 2 3
The image contains a graph with the following components:

- The top graph shows a density function, labeled as `dnorm(x, target_mu, target_sd)`.
- The middle graph is a trace plot, indicating the path of a random walk Metropolis-Hastings algorithm.
- The bottom graph represents the Metropolis-Hastings proposal density.

The x-axis ranges from -3 to 3, and the y-axis represents the probability density.
dnorm(x, target_mu, target_sd)

Trace

Metropolis–Hastings

-3 -2 -1 0 1 2 3
\texttt{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\texttt{dnorm(x, target\_mu, target\_sd)}

\begin{itemize}
  \item \texttt{Trace}
  \item \texttt{Metropolis-Hastings}
\end{itemize}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings
The image contains a graph with three panels. The top panel shows the density function of a normal distribution with a mean of 0 and a standard deviation of 1, denoted as $dnorm(x, \mu, \sigma)$, where $\mu = 0$ and $\sigma = 1$. The middle panel is a trace plot, which shows a Markov chain Monte Carlo (MCMC) sample from the target distribution. The bottom panel displays the Metropolis-Hastings algorithm with an acceptance rate of 0.9. The trace plot indicates the evolution of the MCMC sample over iterations, highlighting the exploration of the parameter space.
\texttt{dnorm(x, target\_mu, target\_sd)}

\textbf{Trace}

\textbf{Metropolis–Hastings}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\begin{align*}
\text{Trace} \\
\text{Metropolis–Hastings}
\end{align*}
\text{dnorm}(x, \text{target\_mu, target\_sd})
The Metropolis-Hastings algorithm is illustrated in the diagram. The top panel shows the target distribution (solid line) and the proposal distribution (dotted line). The middle panel is the trace of the Markov chain generated by the Metropolis-Hastings algorithm. The bottom panel shows the density of the target distribution (solid line) and the density of the proposal distribution (dotted line). The chain starts at a value of 0 and moves along the x-axis, with the trace showing the path taken by the chain. The proposal distribution is centered around the current value, and the acceptance probability is determined by the ratio of the target density to the proposal density.
```r
dnorm(x, target_mu, target_sd)
```
The image contains a plot of the normal distribution function with two different target means and standard deviations. The plot is labeled as `dnorm(x, target_mu, target_sd)`. The `Trace` label indicates a trace plot, likely a sample chain from a Markov Chain Monte Carlo (MCMC) simulation. The `Metropolis-Hastings` label suggests the use of the Metropolis-Hastings algorithm for generating samples from a probability distribution.
The diagram shows a comparison of two density functions, denoted as $dnorm(x, \text{target}_\mu, \text{target}_{sd})$. The solid red line represents one density function, while the dashed blue line represents another. The trace plot (middle) and Metropolis-Hastings plots (bottom) illustrate the sampling process, with the trace plot showing the trajectory of samples and the Metropolis-Hastings plots showing the acceptance of proposals.
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis–Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

\texttt{Trace}

\texttt{Metropolis-Hastings}
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3

-3 -2 -1 0 1 2 3
\textbf{Trace} plot and \textbf{Metropolis-Hastings} samples from a target distribution.

\begin{align*}
\text{dnorm}(x_{\text{target\_mu}}, \text{target\_sd})
\end{align*}
`dnorm(x, target_mu, target_sd)`
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
The image contains a graph with three subplots. The top subplot shows a distribution function labeled `dnorm(x, target_mu, target_sd)` with two overlapping curves. The middle subplot is labeled `Trace` and displays a trace plot of a Markov Chain Monte Carlo (MCMC) process. The bottom subplot is labeled `Metropolis-Hastings` and shows another trace plot with a vertical line indicating a point of interest.
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis–Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma_d)
Metropolis–Hastings

Trace

dnorm(x, target_mu, target_sd)
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
\texttt{dnorm(x, target\_mu, target\_sd)}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
$dnorm(x, \text{target} \_\mu, \text{target} \_sd)$

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu, target\_sd})

\begin{align*}
\text{Trace} & \\
\text{Metropolis-Hastings} & 
\end{align*}
The plot illustrates the Metropolis-Hastings algorithm with the following components:

- The top graph shows the density function, denoted as `dnorm(x, target_mu, target_sd)`.
- The middle graph displays the trace of samples from the algorithm.
- The bottom graph presents the Metropolis-Hastings acceptance probability.
\texttt{dnorm(x, target\_mu, target\_sd)}

\begin{align*}
\text{Trace} \\
\text{Metropolis–Hastings}
\end{align*}
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3
\texttt{dnorm(x, target\_mu, target\_sd)}
The diagram illustrates the Metropolis-Hastings algorithm. The top panel shows the distribution function \( dnorm(x, \text{target\_mu}, \text{target\_sd}) \), while the middle panel represents the trace of the Markov chain. The bottom panel displays the Metropolis-Hastings proposal distribution.
\[ \text{dnorm}(x, \text{target}\_\mu, \text{target}\_sd) \]
The image shows a graph with two normal distribution curves represented by solid and dashed lines, respectively. The x-axis is labeled with values from -3 to 3, and the y-axis is labeled with the function `dnorm(x, target_mu, target_sd)`.

The upper graph depicts the density function for two normal distributions with different means and standard deviations. The lower graph shows a trace plot with Metropolis-Hastings sampled points, indicating the path of the sampling process over the parameter space.

The middle graph illustrates the trace of the sampling process over a parameter, possibly a time series or a sequence of samples, indicating the evolution of the distribution's fitted values or parameters over iterations.
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis–Hastings

\begin{align*}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\end{align*}
$dnorm(x, \text{target}_\mu, \text{target}_\sigma)$

Trace

Metropolis-Hastings
$dnorm(x, \text{target}_{\mu}, \text{target}_{\text{sd}})$
The graph shows the density function `dnorm(x, target_mu, target_sd)` and the corresponding trace and Metropolis-Hastings samples. The trace plot displays the path of samples generated by the Metropolis-Hastings algorithm, while the density plot illustrates the target distribution and the proposal distribution.
dnorm(x, target_mu, target_sd)

Trace

Metropolis–Hastings
The image shows a plot of the density function of a normal distribution. The plot includes a red solid line representing the density function, and a blue dashed line representing the target distribution. The x-axis is labeled with values ranging from -3 to 3, and the y-axis is unannotated. The plot is labeled "Trace" and "Metropolis-Hastings."
$$d\text{norm}(x, \text{target\_mu}, \text{target\_sd})$$

Trace

Metropolis–Hastings
\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]
The diagram shows the normal distribution function \( \text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma) \) with two different distributions being compared. The top plot displays the density function, and the bottom plot shows the Metropolis-Hastings trace with the target distribution indicated by the dashed line. The trace path demonstrates the movement through the target distribution.
The image contains a graph with the title "dnorm(x, target_mu, target_sd)". The graph shows a distribution curve with two peaks, one on the left side around -1 and another on the right side around 1. The y-axis is labeled "dnorm(x, target_mu, target_sd)". The x-axis is labeled with values ranging from -3 to 3.

There is a trace plot below the main graph, showing a series of connected points that form a zigzag pattern, indicating the sampling process of a Metropolis-Hastings algorithm. The trace plot is labeled "Trace".

At the bottom of the image, there is another graph labeled "Metropolis-Hastings", which seems to be a demonstration of the Metropolis-Hastings algorithm's behavior on the target distribution.

The graph likely represents a demonstration of how the Metropolis-Hastings algorithm can be used to sample from a complex distribution, particularly a normal distribution centered around two distinct means.
The image contains a graph with the title "dnorm(x, target_mu, target_sd)". The graph is divided into three sections labeled "Trace" and "Metropolis-Hastings". The trace section shows a series of points forming a path, while the Metropolis-Hastings section displays a bell curve. The x-axis is labeled with values from -3 to 3, and the y-axis appears to represent the probability density function of a normal distribution.

The graph illustrates an MCMC (Markov Chain Monte Carlo) simulation process, where the trace section shows the movement of the sample points over iterations, and the Metropolis-Hastings section represents the proposal distribution used in the sampling process.
The image shows a graph with three panels:

1. The top panel displays a normal distribution function `dnorm(x, target.mu, target.sd)`.
2. The middle panel illustrates a trace plot, which appears to be a sample path of a Markov chain Monte Carlo (MCMC) simulation.
3. The bottom panel depicts a Metropolis-Hastings acceptance probability distribution.

The horizontal axis is labeled with numerical values ranging from -3 to 3.
$dnorm(x, \text{target}_\mu, \text{target}_sd)$

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
$$dnorm(x, \text{target\_mu}, \text{target\_sd})$$

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
The image shows a graph with a normal distribution (dnorm(x, target_mu, target_sd)) in the top panel. The middle panel displays a trace plot, while the bottom panel illustrates a Metropolis-Hastings algorithm. The trace plot appears to have a zigzag pattern, indicating the movement of the algorithm across the parameter space.
```r
dnorm(x, target_mu, target_sd)
```
The diagram illustrates the Metropolis-Hastings algorithm, with traces of a Markov chain sampled from a distribution. The top panel shows the target distribution, the middle panel is the trace of the sampled chain, and the bottom panel displays the distribution of the sampled values. The formula for the normal distribution is also shown: \( \text{dnorm}(x, \text{target}\_\mu, \text{target}\_\sigma) \).
$$dnorm(x, \text{target\_mu}, \text{target\_sd})$$
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis–Hastings

\texttt{}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis-Hastings

\[ -3 \quad -2 \quad -1 \quad 0 \quad 1 \quad 2 \quad 3 \]
The diagram shows a plot of a normal distribution function, `dnorm(x, target_mu, target_sd)`, which represents the probability density function of a normal distribution. The trace plot illustrates the sampling process of a Metropolis-Hastings algorithm, where the red line represents the target distribution and the blue line represents the proposal distribution. The Metropolis-Hastings algorithm is a Markov chain Monte Carlo method used to obtain a sequence of samples from a probability distribution for which direct sampling is difficult. The trace plot demonstrates how the algorithm moves from one state to another, attempting to converge to the target distribution.
The diagram illustrates the Metropolis-Hastings algorithm with two normal distributions. The red curve represents the target distribution, and the blue dashed line shows the proposal distribution. The trace plot in the middle visualizes the Markov chain samples as they move through the parameter space. The Metropolis-Hastings acceptance ratio is evident in the final trace plot, where new samples are accepted or rejected based on the ratio of the proposal and target distributions.
$dnorm(x, \text{target\_mu, target\_sd})$

Trace

Metropolis-Hastings
\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]
Metropolis–Hastings

Trace

$$dnorm(x, \text{target} \mu, \text{target} \sigma)$$
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
$dnorm(x, \text{target}\_\mu, \text{target}\_sd)$

Trace

Metropolis–Hastings

$-3$ $-2$ $-1$ $0$ $1$ $2$ $3$
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
$dnorm(x, \text{target}\_\mu, \text{target}\_\sigma)$

Trace

Metropolis–Hastings
\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]

**Trace**

**Metropolis-Hastings**
\texttt{dnorm(x, target\_mu, target\_sd)}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis–Hastings}
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)

\text{Trace}

\text{Metropolis-Hastings}
\texttt{dnorm(x, target\_mu, target\_sd)}
\text{dnorm}(x, \text{target\_mu, target\_sd})

\begin{align*}
\text{Trace} \\
\text{Metropolis-Hastings}
\end{align*}
\texttt{dnorm(x, target\_mu, target\_sd)}
The image shows a plot with the following elements:

1. **Top Panel**: The plot appears to represent a probability density function, likely a normal distribution, denoted as `dnorm(x, target_mu, target_sd)`.
2. **Middle Panel**: This panel contains a trace plot, which is a visualization of the path taken by a Markov chain Monte Carlo (MCMC) simulation. The trace plot shows the evolution of the parameter(s) being estimated over the iterations of the MCMC algorithm.
3. **Bottom Panel**: The bottom panel illustrates the Metropolis-Hastings algorithm, which is a method for constructing a Markov chain that has a desired stationary distribution. The plot likely shows the acceptance rate of proposed moves in the algorithm.

The x-axis in all panels ranges from -3 to 3, and the y-axis is not clearly defined in the image description but is typically related to the probability density or the parameter being estimated.
\textbf{dnorm(x, target_mu, target_sd)}

\begin{itemize}
  \item Trace
  \item Metropolis–Hastings
\end{itemize}
The image shows a graph of a probability distribution, specifically a normal distribution (dnorm(x, target_mu, target_sd)). The graph includes a trace plot and a Metropolis-Hastings trace, indicating the sampling process over a range of values from -3 to 3.
\texttt{dnorm(x, target\_mu, target\_sd)}

\begin{align*}
\text{Trace} & \quad \text{Metropolis-Hastings}
\end{align*}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\begin{align*}
\text{Trace} \\
\text{Metropolis–Hastings}
\end{align*}
\[ \text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma) \]

Trace

Metropolis–Hastings

-3 -2 -1 0 1 2 3
The figure illustrates the relationship between the density function $dnorm(x, \text{target}_\mu, \text{target}_{sd})$ and a trace plot. The density function is shown at the top, with the solid red line representing the target distribution and the dashed blue line representing the proposal distribution. The middle panel shows a trace plot, which is a series of points sampled from the target distribution. The bottom panel displays the Metropolis-Hastings acceptance probability, represented by the dashed blue line, which indicates the probability of accepting a proposed move based on the target distribution.
\[ \text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma) \]

Trace

Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}
dfnorm(x, target_mu, target_sd)
$$dnorm(x, \text{target\_mu}, \text{target\_sd})$$

Trace

Metropolis–Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

\textbf{Trace}

\textbf{Metropolis–Hastings}
$dnorm(x, \text{target\_mu}, \text{target\_sd})$
The plot shows the density function of a normal distribution (dnorm) with different parameters. The trace plot below the density function represents the sampling process in a Metropolis-Hastings algorithm. The x-axis indicates the range from -3 to 3, and the y-axis represents the probability density.
$\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis–Hastings
A graph showing the Metropolis-Hastings algorithm with two target distributions: one represented by the solid red line and the other by the dashed blue line. The trace plot below the distribution lines shows the path taken by the algorithm, indicating how it moves through the parameter space. The Metropolis-Hastings algorithm is used to generate samples from a distribution when direct sampling is difficult.
dnorm(x, target_mu, target_sd)
Metropolis–Hastings

Trace

$dnorm(x, \text{target}_\mu, \text{target}_\sigma)$
dnorm(x, target_mu, target_sd)
$dnorm(x, \text{target}_\mu, \text{target}_\sigma)$

Trace

Metropolis–Hastings
\text{dnorm}(x, \text{target\_mu, target\_sd})
The image contains a graph with the following components:

- The top section labeled "dnorm(x, target_mu, target_sd)" shows a normal distribution curve.
- The middle section labeled "Trace" displays a trace plot of a Markov Chain Monte Carlo (MCMC) simulation.
- The bottom section labeled "Metropolis-Hastings" illustrates the acceptance rates of proposed moves in the MCMC algorithm.

The graph spans from -3 to 3 on the x-axis, with the normal distribution curve and trace plot showing the evolution of the sampling process.
$dnorm(x, \text{target\_mu}, \text{target\_sd})$
The image shows a plot of a normal distribution function, denoted as \( \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \), with the x-axis ranging from -3 to 3. The plot includes a trace of a Metropolis-Hastings algorithm, with a vertical line indicating a specific point on the x-axis.
\text{dnorm}(x, \text{target}_{\mu}, \text{target}_{sd})
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)

\begin{align*}
&\text{Trace} \\
&\text{Metropolis–Hastings}
\end{align*}
The image shows a graph with a normal distribution curve labeled `dnorm(x, target_mu, target_sd)` in the top panel. The middle panel represents a trace plot, while the bottom panel displays a Metropolis-Hastings algorithm.
`dnorm(x, target_mu, target_sd)`

Trace

Metropolis-Hastings
The image shows a graph with three panels. The top panel displays the probability density function (PDF) of a normal distribution, denoted as $\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})$. The middle panel illustrates a trace plot of a Markov Chain Monte Carlo (MCMC) simulation, indicating the sampled values over iterations. The bottom panel demonstrates the Metropolis-Hastings algorithm with a proposed exploration of the parameter space, showing how the algorithm moves between different states in the search for the target distribution.
\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]
d\text{norm}(x, \text{target}_\mu, \text{target}_sd)

Trace

Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}
Metropolis-Hastings

$\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})$

Trace

$\chi$
\texttt{dnorm(x, target\_mu, target\_sd)}
\texttt{dnorm(x, target\_mu, target\_sd)}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
The diagram illustrates the Metropolis-Hastings algorithm in action. The top plot shows the target distribution (solid line) and the proposal distribution (dashed line). The middle plot is the trace of the Markov chain, indicating the samples drawn from the target distribution. The bottom plot displays the Metropolis-Hastings acceptance ratio, with the green dot representing the current state and the distribution showing the proposal distribution. The algorithm iterates, proposing new states and accepting or rejecting them based on the Metropolis-Hastings ratio, aiming to converge to the target distribution.
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\begin{align*}
\text{Trace} \\
\text{Metropolis-Hastings}
\end{align*}
\texttt{dnorm(x, target\_mu, target\_sd)}

\texttt{Metropolis-Hastings}

\texttt{Trace}
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis–Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

\textbf{Trace}

\textbf{Metropolis-Hastings}
\text{dnorm}(x, \text{target\_mu, target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
$$dnorm(x, \text{target\_mu}, \text{target\_sd})$$

Trace

Metropolis-Hastings

$x$

-3 -2 -1 0 1 2 3
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\textbf{Trace}
\text{dnorm}(x, \text{target}_\text{mu}, \text{target}_\text{sd})

\text{Trace}

\text{Metropolis-Hastings}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
Metropolis-Hastings
\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]
$dnorm(x, \text{target}_\mu, \text{target}_\text{sd})$

**Trace**

**Metropolis–Hastings**
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
\text{dnorm}(x, \text{target}\_\mu, \text{target}\_\text{sd})

\text{Trace}

\text{Metropolis-Hastings}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
\begin{equation}
dnorm(x, \text{target}_\mu, \text{target}_sd)
\end{equation}
$dnorm(x, \text{target}_\mu, \text{target}_\sigma)$

Trace

Metropolis–Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}
\texttt{dnorm(x, target\_mu, target\_sd)}
The graph represents the distribution of a variable with the density function specified by the `dnorm(x, target_mu, target_sd)` function. The upper graph shows the density function, while the middle graph displays the trace of the sampled values, indicating the Markov chain's path. The lower graph illustrates the Metropolis-Hastings acceptance probability, with the dotted line representing the proposal distribution and the solid line the target distribution.
\texttt{dnorm(x, target_mu, target_sd)}
\texttt{dnorm(x, target\_mu, target\_sd)}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis–Hastings}
\texttt{dnorm(x, target\_mu, target\_sd)}

\texttt{Trace}

\texttt{Metropolis-Hastings}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\textbf{Metropolis–Hastings}

\textbf{Trace}

\textbf{dnorm(x, target\_mu, target\_sd)}
$dnorm(x, \text{target\_mu}, \text{target\_sd})$
dnorm(x, target_mu, target_sd)
The image shows a graph of a probability distribution function (PDF) and a trace plot. The PDF is represented by two curves: one solid and one dashed. The trace plot below the PDF shows the sampling process with the Metropolis-Hastings algorithm, indicated by the zigzag pattern. The x-axis is labeled with values ranging from -3 to 3.
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
\texttt{dnorm(x, target\_mu, target\_sd)}

\begin{itemize}
\item Trace
\item Metropolis–Hastings
\end{itemize}
$$dnorm(x, \text{target}_\mu, \text{target}_{sd})$$
```
dnorm(x, target_mu, target_sd)
```
\[
dnorm(x, \text{target}_\mu, \text{target}_\sigma)
\]
The image shows a plot of a probability density function and a trace plot. The density function is represented by a red solid line, and the trace plot is shown in black. The trace plot appears to be generated using the Metropolis-Hastings algorithm, indicated by the title "Metropolis-Hastings" on the right side of the diagram.
The diagram illustrates the Metropolis-Hastings algorithm. The trace of the Markov chain is shown in the middle section, indicating the path of the algorithm's movements between different states. The density function, denoted as $\text{dnorm}(x, \text{target}_\mu, \text{target}_{sd})$, is depicted in the top section, showing how the probability density varies with the variable $x$. The Metropolis-Hastings step is illustrated by the transition from one state to another, demonstrating how the algorithm adjusts its proposals to explore the state space effectively.
The diagram illustrates the relationship between the density function of a normal distribution (dnorm(x, target_mu, target_sd)) and its corresponding trace plot. The Metropolis-Hastings algorithm is used to simulate samples from the target distribution. The trace plot shows the evolution of the chain over iterations, with each point representing a sample drawn from the target distribution. The density function is shown with a solid line, while the trace plot is depicted with a dashed line, highlighting the path the chain takes through the parameter space.
The image shows a Metropolis-Hastings algorithm trace for a normal distribution with a target mean ($\mu_{target}$) and standard deviation ($\sigma_{target}$). The trace is depicted in black, with the target distribution in red and the proposal distribution in blue. The trace demonstrates the movement of the algorithm as it samples from the target distribution, aiming to converge to the target distribution's mode.
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\begin{align*}
\text{Trace} & \quad -3 & -2 & -1 & 0 & 1 & 2 & 3 \\
\text{Metropolis–Hastings} & \quad -3 & -2 & -1 & 0 & 1 & 2 & 3
\end{align*}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
$dnorm(x, \text{target}_\mu, \text{target}_\sigma)$

Trace

Metropolis-Hastings
$dnorm(x, \text{target}_\mu, \text{target}_\sigma)$

Trace

Metropolis–Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}
\[ \text{dnorm}(x, \text{target}_\mu, \text{target}_{sd}) \]
\text{dnorm}(x, \text{target_mu}, \text{target_sd})
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)
dnorm(x, target_mu, target_sd)
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_\text{sd})

\text{Trace}

\text{Metropolis–Hastings}
\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]
The image shows a graph with the following components:

1. **Trace Plot**: The middle panel displays a trace plot of samples generated by the Metropolis-Hastings algorithm. The samples are shown as a line tracing through the target distribution, indicating the progression of the sampling process over iterations.

2. **Density Plot**: The top panel shows a density plot of the target distribution (solid red line) and the proposal distribution (dashed blue line). The density plot visualizes the probability density function (PDF) of the distributions.

3. **Metropolis-Hastings Algorithm**: The bottom panel illustrates the acceptance and rejection criteria of the Metropolis-Hastings algorithm. The solid black line represents the target distribution, and the dashed blue line represents the proposal distribution. The green dot indicates the starting point for the sampling process, and the vertical lines show the range of accepted values after applying the acceptance ratio.

The graph demonstrates how the Metropolis-Hastings algorithm moves through the parameter space, guided by the target distribution, to generate samples that approximate the posterior distribution.
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
The image contains a graph with three distinct sections labeled as 'dnorm(x, target_mu, target_sd)', 'Trace', and 'Metropolis-Hastings'. The graph illustrates the distribution of data points and their movement over iterations, indicating the use of Metropolis-Hastings algorithm for sampling from a probability distribution. The horizontal axis represents the range from -3 to 3, and the vertical axis shows the density of the distribution.
```r
dnorm(x, target_mu, target_sd)
```

- **Trace**
  - The trace plot shows the sequence of samples drawn from the posterior distribution.
  - The blue dashed line represents the proposal distribution, while the red line shows the target distribution.

- **Metropolis-Hastings**
  - The Metropolis-Hastings algorithm is used to generate samples from the posterior distribution.
  - The algorithm accepts or rejects new samples based on the ratio of the target distribution to the proposal distribution.

- The x-axis represents the range of values, from -3 to 3.
- The y-axis represents the density of the distribution.
- The trace plot illustrates how the samples are drawn over time, showing the evolution of the sampling process.
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\texttt{dnorm(x, target\_mu, target\_sd)}
The figure shows a graph of the normal distribution function $dnorm(x, \text{target}_\mu, \text{target}_\sigma)$ with the target parameters set to $\mu$ and $\sigma$. The trace plot below the density function shows the samples drawn from the distribution over iterations, indicating the Metropolis-HastingsMarkov chain Monte Carlo algorithm in action. The blue dashed line represents the proposed distribution, while the black line shows the accepted samples, indicating how the chain moves across the parameter space, trying to explore the distribution efficiently.
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis-Hastings
The diagram illustrates a Metropolis-Hastings algorithm. The top panel shows the target distribution (solid red line) and the proposal distribution (dashed blue line). The middle panel presents the trace of the algorithm's iterations, indicating the path taken by the sampler. The bottom panel displays the Metropolis-Hastings acceptance decision, with the proposal distribution (dashed blue line) and the target distribution (solid black line) at the current state.
$dnorm(x, target\_mu, target\_sd)$
$\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})$
The image shows a graph with the title "likelihood_ratio_plot.png". The graph appears to be a plot of a normal distribution with a dashed line and a solid line representing different parameters or conditions. The x-axis is labeled with values from -3 to 3, and the y-axis is labeled as "dnorm(x, target_mu, target_sd)". The graph includes a trace plot and a Metropolis-Hastings plot, indicating a simulation or sampling process. The figure seems to illustrate the comparison of two normal distributions with different parameters.
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
The diagram illustrates the Metropolis-Hastings algorithm, showing the distribution of a target distribution (solid red line) and the proposal distribution (dashed blue line). The trace plot (bottom middle) and the Metropolis-Hastings plot (bottom right) are used to track the evolution of the algorithm over iterations.
metnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)
`dnorm(x, target_mu, target_sd)`

Trace

Metropolis-Hastings
\texttt{dnorm(x, target_mu, target_sd)}
The image depicts a graphical representation of a norm distribution function and related trace and Metropolis-Hastings plots. The norm function is shown as a solid red line, with a dashed blue line possibly representing variations or another distribution. The trace plot illustrates the movement or sampling process over a range of values, with notable clustering around specific points. The Metropolis-Hastings plot seems to show the acceptance or rejection of proposed samples, with vertical lines indicating accepted samples. The horizontal axis ranges from -3 to 3, and the vertical axis seems to scale with the density function, showing peaks and troughs corresponding to the norm distribution. The plot provides insight into the sampling process and distribution properties.
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\text{dnorm}(x, \text{target}\_\text{mu}, \text{target}\_\text{sd})
The image shows a graph of a normal distribution function, $dnorm(x, \text{target\_mu}, \text{target\_sd})$, with two different distributions plotted: the solid red line representing the target distribution and the dashed blue line showing a sampled distribution. The horizontal axis represents the range of $x$ values, and the vertical axis shows the density of the distribution. The graph also includes a trace of the Metropolis-Hastings algorithm, with the solid black line indicating the sampled trajectory. The tick marks on the axes are at -3, -2, -1, 0, 1, 2, and 3.
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3
\text{n}\text{orm}(x, \text{target}\_\text{mu}, \text{target}\_\text{sd})
The image shows a graphical representation of a normal distribution function, `dnorm(x, target_mu, target_sd)`, with two traces overlaying it. The traces are labeled as 'Trace' and 'Metropolis-Hastings'. The x-axis ranges from -3 to 3, with markers at -3, -2, -1, and 1. The y-axis is not labeled, and the graph includes a legend at the bottom left corner.
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

x
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3  -2  -1  0  1  2  3
The diagram illustrates the Metropolis-Hastings algorithm. The top panel shows the probability density function (PDF) of a target distribution, with the solid red line representing the true distribution and the dashed blue line representing the proposal distribution. The middle panel displays the trace of the Markov chain, indicating the sequence of samples generated by the algorithm. The bottom panel compares the true distribution with its approximation, highlighting the convergence of the Markov chain to the target distribution.
dnorm(x, target_mu, target_sd)
dnorm(x, target_mu, target_sd)
The image shows a graph with a normal distribution curve (dnorm(x, target_mu, target_sd)) plotted on the top. Below it, a trace plot is displayed, showing the Metropolis-Hastings algorithm's trajectory. The x-axis ranges from -3 to 3, with ticks at -3, -2, -1, 0, 1, 2, and 3.
The figure shows a comparison of the target distribution (red solid line) and the proposal distribution (blue dashed line) for a Metropolis-Hastings algorithm. The trace plot (middle) illustrates the samples drawn from the target distribution. The Metropolis-Hastings acceptance ratio is also visualized (bottom).
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
$$\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})$$
$dnorm(x, \text{target}_{\mu}, \text{target}_{sd})$

Trace

Metropolis–Hastings
\textbf{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\textbf{Trace}

\textbf{Metropolis-Hastings}
The diagram illustrates a distribution function, likely representing a probability density function, with the title `dnorm(x, target_mu, target_sd)` indicating it's a normal distribution with parameters `target_mu` and `target_sd`. The `Trace` section shows a series of steps or samples taken from this distribution, possibly as part of a Markov Chain Monte Carlo (MCMC) simulation. The `Metropolis-Hastings` line represents the acceptance or rejection of these steps, with the solid line indicating accepted steps and the dashed line indicating rejected steps. The green dot at the bottom might represent the starting point or a specific parameter value in the simulation process.
...
\texttt{dnorm(x, target\_mu, target\_sd)}
\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]
dnorm(x, target_mu, target_sd)
```markdown
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
```

*Trace*

*Metropolis-Hastings*
```r
dnorm(x, target_mu, target_sd)
```
\texttt{dnorm(x, target\_mu, target\_sd)}
\texttt{dnorm(x, target\_mu, target\_sd)}
The diagram illustrates a probability distribution with a red and a blue curve. The red curve represents the standard normal distribution, while the blue curve is a modified distribution. The title on the left indicates the use of the function `dnorm(x, target_mu, target_sd)` for generating the distribution.

The bottom part of the diagram shows a trace plot with a line representing the Metropolis-Hastings algorithm. The trace plot demonstrates the sampling process, with each line segment indicating a step in the algorithm, and a vertical line marking a specific point of interest.
$dnorm(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\texttt{dnorm(x, target_mu, target_sd)}

Trace

Metropolis-Hastings

\begin{align*}
&-3 & -2 & -1 & 0 & 1 & 2 & 3 \\
&\text{Metropolis-Hastings} & \text{Trace} & \text{dnorm(x, target.mu, target.sd)}
\end{align*}
\[ \text{dnorm}(x, \text{target}_\mu, \text{target}_sd) \]
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis–Hastings}
dnorm(x, target_mu, target_sd)
$d\text{norm}(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis–Hastings

$-3$ $-2$ $-1$ $0$ $1$ $2$ $3$
\text{dnorm}(x, \text{target}\_\mu, \text{target}\_sd)
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3

-3 -2 -1 0 1 2 3
\texttt{dnorm(x, target\_mu, target\_sd)}
```r
dnorm(x, target_mu, target_sd)
```

Trace

Metropolis-Hastings
$dnorm(x, \text{target}_\mu, \text{target}_\text{sd})$

Trace

Metropolis-Hastings
```
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
```

**Trace**

**Metropolis-Hastings**

![Graph showing the Metropolis-Hastings algorithm with traces and target distribution.](image-url)
\text{dnorm}(x, \text{target\_mu, target\_sd})

Trace

Metropolis-Hastings

\[ -3 \quad -2 \quad -1 \quad 0 \quad 1 \quad 2 \quad 3 \]
\texttt{dnorm(x, target_mu, target_sd)}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
The diagram shows a Metropolis-Hastings algorithm in action. The top graph represents the target distribution (solid red line) and the proposal distribution (dashed blue line). The middle graph is the trace plot, showing the samples drawn from the target distribution. The bottom graph illustrates the acceptance probabilities.
\[ \text{dnorm}(x, \text{target}_\mu, \text{target}_sd) \]
[Text content is not visible in the image.]
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target} \_\mu, \text{target} \_sd)
\[ \text{dnorm}(x, \text{target}_\mu, \text{target}_{sd}) \]

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu, target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
The image shows a plot of the density function of a normal distribution (dnorm) with a mean (target_mu) and a standard deviation (target_sd). The plot includes a trace of the Metropolis-Hastings algorithm, which is a method for generating samples from a probability distribution. The trace demonstrates the movement of the samples over iterations, showing how the algorithm converges to the desired distribution. The x-axis represents the range of values for the variable, and the y-axis represents the probability density. The plot also includes the normal distribution curve for comparison.
$dnorm(x, target_mu, target_sd)$

Trace

Metropolis-Hastings
```
dnorm(x, target_mu, target_sd)
```

```
Metropolis-Hastings
```

Trace

```
-3 -2 -1 0 1 2 3
```

```
-3 -2 -1 0 1 2 3
```
dnorm(x, target_mu, target_sd)
$dnorm(x, \text{target}_\mu, \text{target}_\sigma)$

Trace

Metropolis–Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings
```
dnorm(x, target_mu, target_sd)
```

Trace

Metropolis–Hastings
trace

Metropolis-Hastings

dnorm(x, target_mu, target_sd)
\[ \text{dnorm}(x, \text{target}_\mu, \text{target}_\text{sd}) \]

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)
\text{dnorm}(x, \text{target}\_\mu, \text{target}\_\text{sd})

\text{Trace}

\text{Metropolis-Hastings}
The diagram shows the distribution of a variable $x$ with a normal distribution $\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)$, which is a function of $x$, $\text{target}_\mu$, and $\text{target}_\sigma$. The trace of the Metropolis-Hastings algorithm is also depicted, illustrating the sampling process. The Metropolis-Hastings algorithm is a Markov Chain Monte Carlo (MCMC) method used to obtain a sequence of samples from a probability distribution, using only the knowledge of the probability distribution itself, rather than a direct method for sampling from it. The trace plot shows the path taken by the algorithm in the parameter space, which helps in assessing the mixing of the Markov chain and the convergence of the algorithm to the target distribution.
$$dnorm(x, \text{target\_mu}, \text{target\_sd})$$
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis–Hastings}
The diagram illustrates the Metropolis-Hastings algorithm. The upper graph shows the target density (solid line) and the proposal density (dashed line). The middle graph is the trace plot, which tracks the samples generated by the algorithm. The lower graph provides a visual representation of the Metropolis-Hastings process, with the current state marked by a green dot. The equation `dnorm(x, target_mu, target_sd)` represents the target distribution function.
The diagram illustrates a Metropolis-Hastings algorithm, which is a Markov chain Monte Carlo method for obtaining a sequence of samples from a probability distribution. The trace plot shows the trajectory of the samples as they are drawn from the target distribution. The left panel displays the density of the target distribution, and the right panel shows the acceptance ratio used in the Metropolis-Hastings algorithm.
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
$dnorm(x, \text{target\_mu, target\_sd})$

Trace

Metropolis–Hastings
The diagram illustrates the Metropolis-Hastings algorithm, showing the trace of the Markov chain and the acceptance probability.

The plot compares the target distribution (solid line) with the proposal distribution (dashed line) and the acceptance function (dotted line).

The trace plot shows the chain's movement from left to right, with each step indicating a move within the target distribution, while the Metropolis-Hastings acceptance probability is visualized on the right side.
$dnorm(x, \text{target}_\mu, \text{target}_\sigma)$

Trace

Metropolis–Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

\textbf{Trace}

\textbf{Metropolis-Hastings}
$d\text{norm}(x, \text{target}\_\mu, \text{target}\_sd)$

Trace

Metropolis–Hastings
dnorm(x, target_mu, target_sd)
$dnorm(x, \text{target\_mu}, \text{target\_sd})$
$dnorm(x, \text{target}\_\mu, \text{target}\_sd)$

Trace

Metropolis–Hastings
$dnorm(x, \text{target\_mu, target\_sd})$
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis–Hastings

\( x \leq 3 \)
$$dnorm(x, \text{target\_mu}, \text{target\_sd})$$

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\begin{align*}
\text{Trace} \\
\text{Metropolis–Hastings}
\end{align*}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
$dnorm(x, \text{target}_{\mu}, \text{target}_{sd})$

Trace

Metropolis–Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Metropolis-Hastings}
The image shows a graphical representation of the `dnorm` function with parameters `x`, `target_mu`, and `target_sd`. The trace plot below the density function illustrates the sampling process of a Metropolis-Hastings algorithm. The `dnorm` density is depicted with a solid red line, while the blue dashed line represents the target distribution. The trace plot shows the path taken by the algorithm as it samples from the target distribution. The Metropolis-Hastings acceptance probability is visualized by the green dot, indicating a successful move in the sampling process.
\text{dnorm}(x, \text{target}_\mu, \text{target}_\text{sd})

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3

-3 -2 -1 0 1 2 3
The graph shows a comparison of two normal distributions, denoted as

\[ \text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma) \]

with solid and dashed lines respectively.

The top section is labeled "dnorm" and includes a variable named "target\_mu".

The middle section is labeled "Trace" and displays a trace plot.

The bottom section is labeled "Metropolis-Hastings" and includes a variable named "\_Hastings".

The x-axis ranges from -3 to 3, and the y-axis is not explicitly labeled but appears to correlate with the distributions.
The diagram illustrates the behavior of a Metropolis-Hastings algorithm in a one-dimensional context. The top panel shows the distribution function `dnorm(x, target_mu, target_sd)` with a solid red line representing the target distribution and a dashed blue line showing the actual distribution generated by the algorithm. The middle panel is labeled 'Trace' and displays the trace of the sampling process, which is a visual representation of the sequence of states visited by the algorithm. The bottom panel is labeled 'Metropolis-Hastings' and features a graph showing the acceptance probability against the proposal distribution, indicating how the algorithm decides whether to accept or reject proposed moves during the sampling process.
The diagram illustrates the Metropolis-Hastings algorithm for sampling from a target distribution. The top graph shows the target distribution (solid red line) and the proposal distribution (dashed blue line). The middle graph is the trace plot, which displays the sampled values along the x-axis. The bottom graph represents the Metropolis-Hastings acceptance probability.
The image displays a graphical representation of a Normal distribution with parameters \( \mu \) and \( \sigma \). The distribution is shown as a solid red line, while the dashed blue line represents the proposal distribution used in the Metropolis-Hastings algorithm. The trace plot below the distribution shows the movement of the sampling process over iterations, with the Metropolis-Hastings algorithm indicated by the black lines. The graph also includes a vertical line at the value \( \theta \), which is the target parameter value.
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
```
dnorm(x, target_mu, target_sd)
```

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3  -2  -1  0  1  2  3
```r
dnorm(x, target_mu, target_sd)
```

![Trace plot](image)

![Metropolis-Hastings](image)
```
dnorm(x, target_mu, target_sd)
```

**Trace**

**Metropolis–Hastings**

![Graphs of distributions and traces](image_url)
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3  -2  -1  0  1  2  3
The figure illustrates the Metropolis-Hastings algorithm with a Normal distribution as the target distribution. The trace plot shows the sampling process over iterations, with the solid line representing the actual sampling path and the dashed line the target distribution. The Metropolis-Hastings acceptance probability is visualized below the trace plot, demonstrating how proposals are accepted or rejected based on the target distribution.
\texttt{dnorm(x, target_mu, target_sd)}

\texttt{Metropolis-Hastings}

\texttt{Trace}
\[ \text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma) \]
$\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis–Hastings
$dnorm(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis–Hastings
\(dnorm(x, \text{target}_\mu, \text{target}_sd)\)
d pem{x, target_mu, target_sd}
\texttt{dnorm(x, target\_mu, target\_sd)}

-3
-2
-1
0
1
2
3

\texttt{Metropolis-Hastings}

Trace

\texttt{Metropolis-Hastings}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis-Hastings
$dnorm(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis−Hastings
```
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
```
The figure illustrates a Metropolis-Hastings algorithm. The top panel shows the density of the target distribution (solid red line) and the proposal distribution (dashed blue line). The middle panel is the trace plot, which tracks the states of a Markov chain generated by the algorithm. The bottom panel represents the Metropolis-Hastings acceptance ratio, with the solid line indicating the target distribution and the dashed line the proposal distribution.
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

\texttt{Metropolis-Hastings}
\texttt{dnorm(x, target\_mu, target\_sd)}
Metropolis–Hastings

\[ \text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma) \]
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
$d\text{norm}(x, \text{target}\_\mu, \text{target}\_sd)$

Trace

Metropolis–Hastings
\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]
$$d\text{norm}(x, \text{target}_\mu, \text{target}_{sd})$$
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\text{dnorm}(x, \text{target}_\mu, \text{target}_sd)
\[
dnorm(x, \text{target}_\mu, \text{target}_\sigma)
\]
The graph shows a probability distribution function (PDF) of a normal distribution with a solid red line and a dashed blue line. The x-axis represents the variable 'x', and the y-axis represents the density function. The trace plot below the density function shows the samples drawn from the distribution. The Metropolis-Hastings algorithm is used to generate these samples. The green dot indicates the target mean of the distribution.
```
dnorm(x, target_mu, target_sd)
```

Trace

Metropolis-Hastings

```
dnorm(x, target_mu, target_sd)
\texttt{dnorm(x, target\_mu, target\_sd)}
$$dnorm(x, \text{target\_mu, target\_sd})$$

Trace

Metropolis–Hastings
The diagram illustrates a probability distribution function (PDF) of a normal distribution, denoted as \( \text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma) \), with a solid red line representing the PDF and a dashed blue line showing a different distribution. The lower part of the diagram shows a trace plot, indicating the sequence of values generated by a Metropolis-Hastings algorithm. The trace plot appears to be a random walk, with points scattered along the x-axis, suggesting the algorithm's exploration of the parameter space. The x-axis is labeled with values from -3 to 3, and points are indicated at specific locations, such as x=2, which might represent accepted samples or steps in the algorithm.
$$\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})$$

Trace

Metropolis–Hastings
The image shows a graph with the following components:

- The top graph is a plot of the function `dnorm(x, target_mu, target_sd)`.
- The middle graph is a trace plot, likely representing samples from a Metropolis-Hastings algorithm.
- The bottom graph is a Metropolis-Hastings acceptance probability plot.

The x-axis ranges from -3 to 3, and the y-axis is not explicitly labeled but likely represents the probability density or other relevant metric.
The image shows a graph with the following components:

- **dnorm(x, target_mu, target_sd)**: This appears to be a normal distribution function with parameters `x`, `target_mu`, and `target_sd`.

- **Trace**: This section shows a trace plot of a Markov Chain Monte Carlo (MCMC) simulation. The plot includes multiple lines indicating the samples drawn from the posterior distribution.

- **Metropolis–Hastings**: This part of the graph shows the proposal distribution (dashed line) and the acceptance distribution (solid line). The green dot indicates the starting point of the chain.

The graph is used to visualize the Metropolis–Hastings algorithm, which is a method for obtaining a sequence of random samples from a probability distribution for which direct sampling is difficult.
\text{nrm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis−Hastings

\begin{align*}
-3 & -2 & -1 & 0 & 1 & 2 & 3 \\
\end{align*}
The diagram illustrates the Metropolis-Hastings algorithm. The top graph shows the target distribution (solid red line) and the candidate proposal distribution (dashed blue line). The middle graph is a trace plot of the Markov chain, indicating the path taken by the algorithm. The bottom graph visualizes the acceptance of proposals, with the solid line representing the target distribution and the dashed line the proposal distribution. The green dot indicates a successful move.
The diagram illustrates the Metropolis-Hastings algorithm, showing a trace plot and kernel density estimates. The trace plot displays the sampling process, while the density estimates show the distribution of the samples.
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
The image shows a graph with a normal distribution curve labeled \( \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \) on the top. Below the curve, there is a trace plot labeled "Trace" with a sequence of points indicating the path taken by a Markov Chain Monte Carlo (MCMC) algorithm. At the bottom, there are two normal distribution curves labeled "Metropolis-Hastings" with different standard deviations, plotted on the same x-axis range from -3 to 3.
\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]

Trace

Metropolis–Hastings
The image shows a plot with the following elements:

- The top part of the plot displays the density function of a normal distribution, labeled as `dnorm(x, target_mu, target_sd)`.

- The middle part of the plot is labeled as `Trace` and shows a trace plot, with various lines indicating a Markov Chain Monte Carlo (MCMC) simulation.

- The bottom part of the plot is labeled as `Metropolis-Hastings` and displays the Metropolis-Hastings algorithm, with two normal distributions and a green dot indicating a sample from the distribution.

The x-axis ranges from -3 to 3, with markers at -3, -2, -1, 0, 1, 2, and 3.
\text{dnorm}(x, \text{target}\_\mu, \text{target}\_\sigma)
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]
The diagram illustrates a comparison between two different probability distributions. The top panel shows a normal distribution (dnorm(x, target_mu, target_sd)) with a solid red line and a dashed blue line representing different scenarios or samples. The middle panel displays a trace plot, which captures the evolution of a variable over time or steps, with numerous short horizontal lines indicating the trajectory of the variable. The bottom panel depicts a Metropolis-Hastings distribution, characterized by a smooth curve with a peak, illustrating the acceptance of candidate samples in the Markov chain Monte Carlo method.
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
dnorm(x, target_mu, target_sd)
\texttt{dnorm}(x, \text{target}\_\text{mu}, \text{target}\_\text{sd})

\texttt{Trace}

\texttt{Metropolis-Hastings}
track

-3 -2 -1 0 1 2 3

dnorm(x, target_mu, target_sd)

Metropolis–Hastings

Trace
\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu, target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
\texttt{dnorm(x, target\_mu, target\_sd)}

\begin{itemize}
  \item Trace
  \item Metropolis–Hastings
\end{itemize}
$dnorm(x, \text{target\_mu, target\_sd})$

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3
\text{dnorm}(x, \text{target\_mu, target\_sd})
```
dnorm(x, target_mu, target_sd)
```

**Trace**

Metropolis–Hastings
$dnorm(x, \text{target}\_\mu, \text{target}\_\sigma)$

Trace

Metropolis–Hastings

-3 -2 -1 0 1 2 3
The image contains a graph showing the distribution of a normal distribution (dnorm(x, target_mu, target_sd)). The trace and Metropolis-Hastings samples are also depicted. The x-axis ranges from -3 to 3, and the y-axis shows the probability density function and the trace path of the sampled values.
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
$dnorm(x, \text{target}_\mu, \text{target}_\sigma)$
\[ \text{dnorm}(x, \text{target}_\mu, \text{target}_\text{sd}) \]

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
The image contains a graph with the title 'dnorm(x, target_mu, target_sd)'. The graph shows a density function with a bell-shaped curve, typical of a normal distribution. The x-axis is labeled with values ranging from -3 to 3, and the y-axis is not labeled. The graph also includes a trace plot that shows the path of the sampling process, indicative of a Metropolis-Hastings algorithm. The trace plot is accompanied by a Metropolis-Hastings acceptance probability plot, which visually represents the acceptance ratio of proposed samples.
\text{n} \text{norm}(x, \text{target}\_\text{mu}, \text{target}\_\text{sd})

\text{Trace}

\text{Metropolis-Hastings}
The image shows a graph with the title 'dnorm(x, target_mu, target_sd)'. The graph contains a trace plot with a density plot of the Metropolis-Hastings algorithm. The x-axis represents the range from -3 to 3, and the y-axis represents the trace of the algorithm over iterations. The trace plot shows the evolution of the parameters over time, with the density plot illustrating the distribution of the parameters at each iteration.
\text{dnorm}(x, \text{target}_\text{mu}, \text{target}_\text{sd})

Trace

Metropolis–Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis–Hastings

-3 -2 -1 0 1 2 3
$dnorm(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis–Hastings

-3  -2  -1  0  1  2  3

$\chi$

-3  -2  -1  0  1  2  3
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
$d\text{norm}(x, \text{target\_mu}, \text{target\_sd})$
\texttt{dnorm(x, target\_mu, target\_sd)}

\begin{align*}
\text{Trace} \\
\text{Metropolis–Hastings}
\end{align*}
\text{dnorm}(x, \text{target\_mu, target\_sd})

Trace

Metropolis–Hastings

-3 -2 -1 0 1 2 3

-3 -2 -1 0 1 2 3
The image shows a plot with a normal distribution curve (solid red line) and a Metropolis-Hastings trace plot. The trace plot represents the movement of a random walk along the normal distribution. The Metropolis-Hastings algorithm is a Markov Chain Monte Carlo method used to sample from a probability distribution. The trace plot demonstrates the path taken by the random walk, which aims to converge to the target distribution. The parameters \( \text{dnorm}(x, \text{target}_\mu, \text{target}_sd) \) indicate the normal distribution with mean \( \text{target}_\mu \) and standard deviation \( \text{target}_sd \).
$dnorm(x, \text{target}_\mu, \text{target}_{sd})$

Trace

Metropolis–Hastings

$-3 \quad -2 \quad -1 \quad 0 \quad 1 \quad 2 \quad 3$
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis–Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
$dnorm(x, \text{target}_\mu, \text{target}_sd)$

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis−Hastings

-3 -2 -1 0 1 2 3
\texttt{dnorm(x, target\_mu, target\_sd)}

\textbf{Trace}

\textbf{Metropolis–Hastings}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
The image shows a comparison of the target distribution and the Metropolis-Hastings (M-H) proposal distribution. The `dnorm(x, target_mu, target_sd)` function represents the target distribution with a normal distribution, where `target_mu` is the mean and `target_sd` is the standard deviation. The `Metropolis-Hastings` function shows the proposal distribution, which is used in the M-H algorithm to propose new states in the Markov Chain Monte Carlo (MCMC) method. The trace plot demonstrates the sampling process, where the green dot indicates the starting point and the black lines show the chain of accepted states. The comparison helps in assessing the efficiency and convergence of the M-H algorithm in approximating the target distribution.
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target}\_\mu, \text{target}\_sd)
\text{dnorm}(x, \text{target}_\text{mu}, \text{target}_\text{sd})

\text{Trace}

\text{Metropolis–Hastings}
\[ \text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma) \]
dnorm(x, target_mu, target_sd)

Trace

Metropolis–Hastings
$dnorm(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
$$dnorm(x, \text{target}\_\mu, \text{target}\_sd)$$
$dnorm(x, \text{target}_\mu, \text{target}_{sd})$

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\texttt{dnorm(x, target.mu, target.sd)}

Trace

Metropolis-Hastings
$dnorm(x, target\_mu, target\_sd)$
\texttt{dnorm(x, target\_mu, target\_sd)}
$$dnorm(x, \text{target\_mu, target\_sd})$$

**Trace**

**Metropolis-Hastings**
\[ \text{dnorm}(x, \text{target}_\mu, \text{target}_sd) \]
The diagram illustrates the Metropolis-Hastings algorithm. The top panel shows the target distribution (solid red line) and the proposal distribution (dashed blue line). The middle panel is the trace plot, which displays the sequence of samples generated by the algorithm. The bottom panel depicts the acceptance probability density function with the current state marked by a green dot. The algorithm moves between these distributions, aiming to converge to the target distribution.
The diagram illustrates the Metropolis-Hastings algorithm with a target distribution represented by the solid red curve, $dnorm(x, target\_mu, target\_sd)$. The trace plot shows the path taken by the algorithm, transitioning between different states, as depicted by the black lines. The Metropolis-Hastings distribution, shown in the lower part of the diagram, contrasts with the target distribution, highlighting the acceptance of proposals based on the ratio of the target distribution to the proposal distribution.
dnorm(x, target_mu, target_sd)
Metropolis-Hastings

Trace

dnorm(x, target_mu, target_sd)
$dnorm(x, \text{target}_\mu, \text{target}_\sigma_d)$

Trace

Metropolis–Hastings
$$d\text{norm}(x, \text{target}_\mu, \text{target}_\sigma)$$

Trace

Metropolis-Hastings
The diagram illustrates a Monte Carlo simulation of a Metropolis-Hastings algorithm, with traces overlaid on a normal distribution. The trace shows the path of the simulated samples, highlighting how the algorithm transitions between samples. The normal distribution (dnorm(x, target_mu, target_sd)) represents the target distribution, and the Metropolis-Hastings algorithm is used to generate samples from this distribution.
\texttt{dnorm(x, target\_mu, target\_sd)}
The image contains a graph that appears to illustrate a distribution function, possibly related to a normal distribution, given the symbol "dnorm" and the notation "x, target_mu, target_sd." The graph shows a plot with the x-axis labeled and a y-axis labeled "dnorm(x, target_mu, target_sd)." The y-axis is scaled between -3 and 3 on the x-axis.

The plot includes a trace of a Markov Chain Monte Carlo (MCMC) simulation, with lines representing the trajectory of the chain. The title "Trace" indicates that this is a visualization of the sampling process over iterations or steps.

Additionally, there is another plot labeled "Metropolis–Hastings," which shows a sampling distribution curve with a smooth bell-shaped curve indicative of a normal distribution. This curve is likely the target distribution used in the MCMC process.

The graph is well-labeled, making it clear that it is a representation of a statistical process, possibly in the context of Bayesian inference or computational statistics.
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\texttt{dnorm(x, target\_mu, target\_sd)}
\textit{dnorm}(x, \text{target}\_\text{mu}, \text{target}\_\text{sd})
```
dnorm(x, target_mu, target_sd)
```

**Trace**

**Metropolis-Hastings**
`dnorm(x, target_mu, target_sd)`

Trace

Metropolis-Hastings
The diagram illustrates the application of the Metropolis-Hastings algorithm. The top plot shows the target distribution (solid line) and the proposal distribution (dashed line). The middle plot is the trace plot, which displays the Markov chain's trajectory over iterations. The bottom plot highlights the Metropolis-Hastings ratio, indicating acceptance probabilities. The chain appears to explore the parameter space efficiently, converging towards the target distribution.
The diagram illustrates a normal distribution function (dnorm(x, target_mu, target_sd)) with two different sets of parameters. The solid red line represents a normal distribution centered at a specific mean, while the dashed blue line represents another normal distribution with a different mean. The trace of a Metropolis-Hastings algorithm is also shown, highlighting the path taken by the algorithm in exploring the parameter space. The trace plot indicates the evolution of the parameter over iterations, showing how the algorithm moves from one point to another, attempting to converge to regions of higher probability.
The plot shows the Metropolis-Hastings algorithm in action, generating samples from a target distribution. The trace of the samples is depicted in the middle panel, with the target distribution (dnorm) in the top panel. The Metropolis-Hastings proposal distribution is represented in the bottom panel.
\text{dnorm} (x, \text{target\_mu}, \text{target\_sd})
The image shows a graph with the following components:

- The title `dnorm(x, target_mu, target_sd)` is shown at the top left.
- The x-axis is labeled from -3 to 3.
- The y-axis is not labeled.
- A `Metropolis-Hastings` line is present at the bottom right.
- A `Trace` line is visible in the middle.
- The graph includes a normal distribution curve represented by a solid red line.
- Another curve, possibly representing a different distribution or transformation, is shown as a dashed blue line.

The graph likely illustrates a demonstration of the Metropolis-Hastings algorithm or a related statistical process involving normal distributions.
$dnorm(x, \text{target\_mu, target\_sd})$

Trace

Metropolis–Hastings
$dnorm(x, \text{target}_\mu, \text{target}_\text{sd})$

Trace

Metropolis–Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
The graph shows a normal distribution function $\text{dnorm}(x, \text{target}_{\mu}, \text{target}_{sd})$. It includes a trace plot illustrating the sampling process over multiple iterations, with Metropolis-Hastings transitions marked by the dashed line. The x-axis ranges from -3 to 3, and the y-axis represents the values of the normal distribution.
\texttt{dnorm(x, target\_mu, target\_sd)}

-3 -2 -1 0 1 2 3

\texttt{Trace}

\texttt{Metropolis-Hastings}
$\text{dnorm}(x, \text{target}\mu, \text{target}\sigma)$

Trace

Metropolis-Hastings
$dnorm(x, \text{target\_mu}, \text{target\_sd})$
\[ \text{dnorm}(x, \text{target}\_\text{mu}, \text{target}\_\text{sd}) \]
\text{dnorm}(x, \text{target}_{\text{mu}}, \text{target}_{\text{sd}})
```r
dnorm(x, target_mu, target_sd)
```

**Trace**

**Metropolis-Hastings**
```
dnorm(x, target_mu, target_sd)
```

- Trace

- Metropolis-Hastings
Metropolis–Hastings

\[ \text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma) \]

Trace

-3 -2 -1 0 1 2 3
The diagram illustrates a Metropolis-Hastings algorithm with a target distribution. The trace plot shows the sampled values, which can be compared to the target distribution. The Metropolis-Hastings acceptance ratio is indicated by the acceptance region (green dot).
```plaintext
dnorm(x, target_mu, target_sd)
```

### Trace

![Trace Plot](image)

### Metropolis-Hastings

![Metropolis-Hastings Plot](image)
The image shows a graphical representation of a probability distribution, specifically a normal distribution curve, denoted as $dnorm(x, \text{target}\_\mu, \text{target}\_sd)$. The graph displays a trace of samples generated by a Metropolis-Hastings algorithm, with the trace lines showing the movement of the samples across the distribution. The x-axis represents the values of $x$ ranging from -3 to 3, and the y-axis represents the probability density. The red curve represents the target distribution, while the blue dashed lines represent the trace of the sampling process, indicating the exploration of the parameter space.
The image contains a graph with various plots and axes labeled. The axes are labeled as follows:

- **Trace**
- **Metropolis-Hastings**
- **dnorm(x, target_mu, target_sd)**

The graph appears to illustrate a comparison between different distributions or functions, possibly in the context of statistical modeling or Bayesian inference. The labels and axes suggest a focus on statistical or computational methods, such as the Metropolis-Hastings algorithm.
$\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis–Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
The image contains a graph with the title "dnorm(x, target_mu, target_sd)". The graph shows a normal distribution with two curves: one solid and one dashed. The x-axis is labeled with values ranging from -3 to 3. The graph also includes a trace plot and a Metropolis–Hastings plot below it, with the trace plot showing a series of lines and the Metropolis–Hastings plot showing a distribution curve.
Metropolis-Hastings
$$dnorm(x, \text{target}_\mu, \text{target}_sd)$$

Trace

Metropolis–Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
\texttt{dnorm(x, target\_mu, target\_sd)}

\textbf{Trace}

\textbf{Metropolis-Hastings}
The image contains a graph with the following features:

- The top section of the graph shows a probability density function (PDF) represented by the formula `dnorm(x, target_mu, target_sd)`.
- The middle section of the graph is labeled as `Trace` and displays a trace plot, indicating the sampling process over time.
- The bottom section of the graph is labeled as `Metropolis-Hastings` and shows the proposal distribution with solid and dashed lines. The solid line represents the target distribution, and the dashed line represents the proposal distribution, with a point indicating the acceptance of a sample.
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
The diagram illustrates the Metropolis-Hastings algorithm. The top plot shows the target distribution (solid line) and the proposal distribution (dashed line). The middle plot displays the trace of the Markov chain, indicating the path taken by the algorithm. The bottom plot depicts the acceptance ratio, showing the comparison between the target and proposal distributions.
dnorm(x, target_mu, target_sd)
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
`dnorm(x, target_mu, target_sd)`

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3

-3 2

−2

-1

0

1

2

3
trace

-3 -2 -1 0 1 2 3

Metropolis-Hastings

-3 -2 -1 0 1 2 3
Metropolis-Hastings

Trace

dnorm(x, target_mu, target_sd)
`dnorm(x, target_mu, target_sd)`

Trace

Metropolis–Hastings
Metropolis–Hastings
$dnorm(x, \text{target}_\mu, \text{target}_\sigma)$

Trace

Metropolis–Hastings
$$dnorm(x, \text{target}_\mu, \text{target}_\sigma)$$

Trace

Metropolis–Hastings
Metropolis-Hastings

Trace

dnorm(x, target_mu, target_sd)
$\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)$

Trace

Metropolis-Hastings
The diagram illustrates the Metropolis-Hastings algorithm for sampling from a target distribution. The red line represents the target distribution, and the blue dashed line shows the trace of the samples generated by the algorithm. The Metropolis-Hastings procedure iteratively samples from a proposal distribution and accepts or rejects these samples based on the ratio of the target distribution to the proposal distribution. The trace shows the evolution of the samples as the algorithm progresses, converging towards the target distribution.
A graph showing the Metropolis-Hastings algorithm with a normal distribution. The trace plot shows a sequence of sampled values from a target distribution, and the Metropolis-Hastings algorithm's acceptance ratio is depicted below with the target distribution and the proposal distribution.
$\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)$

Trace

Metropolis-Hastings
The diagram illustrates the Metropolis-Hastings algorithm. The top panel shows the target distribution (solid red line) and the candidate distribution (dashed blue line). The middle panel is the trace of the Markov chain, and the bottom panel is the Metropolis-Hastings acceptance ratio. The trace shows the path of the Markov chain through the parameter space, while the acceptance ratio determines whether the new proposal is accepted or not.
$$dnorm(x, \text{target}_\mu, \text{target}_sd)$$

Trace

Metropolis–Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

\texttt{T race}
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target}\_\mu, \text{target}\_sd)

\text{Trace}

\text{Metropolis-Hastings}
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3  -2  -1  0  1  2  3
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\begin{align*}
\text{Trace} \\
\text{Metropolis-Hastings}
\end{align*}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
The diagram illustrates the Metropolis-Hastings algorithm. The top graph shows the target distribution (solid red line) and the proposal distribution (dashed blue line). The middle graph is a trace plot, which tracks the samples drawn from the proposal distribution. The bottom graph demonstrates how the algorithm moves between the two distributions.
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
$\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)$

Trace

Metropolis–Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

\texttt{Trace}

\texttt{Metropolis-Hastings}
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis–Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)

\text{Trace}

\text{Metropolis-Hastings}
The graph shows a comparison between the target normal distribution (solid red line) and the sample distribution (dashed blue line). The trace plot below the density plot demonstrates the movement of the sampling process over time. The Metropolis-Hastings algorithm is illustrated by the points that are sampled from the target distribution.
\texttt{dnorm(x, target\_mu, target\_sd)}

\textbf{Trace}

\textbf{Metropolis–Hastings}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis-Hastings
The image shows a graph with the title "Metropolis-Hastings." The graph compares two distributions labeled as \( \text{dnorm}(x, \text{target}_\text{mu}, \text{target}_\text{sd}) \) and \( \text{dnorm}(x, \text{target}_\text{mu}, \text{target}_\text{sd}) \). The graph includes a trace plot and a Metropolis-Hastings acceptance probability plot. The x-axis ranges from -3 to 3.
\begin{align*}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\end{align*}
\texttt{dnorm(x, target_mu, target_sd)}

**Trace**

**Metropolis–Hastings**
$dnorm(x, \text{target}_{\mu}, \text{target}_{\sigma})$

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_\text{sd})

\text{Trace}

\text{Metropolis–Hastings}
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
The figure illustrates the concept of Metropolis-Hastings algorithm. The top graph shows the density function `dnorm(x, target_mu, target_sd)` where `target_mu` and `target_sd` are parameters. The middle graph is a trace plot, indicating the sampling process over iterations. The bottom graph represents the Metropolis-Hastings acceptance ratio, with solid and dashed lines indicating the proposal density and target density, respectively.
\texttt{dnorm(x, target\_mu, target\_sd)}
\texttt{dnorm(x, target\_mu, target\_sd)}
`dnorm(x, target_mu, target_sd)`

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target}_{\mu}, \text{target}_{sd})
dnorm(x, target_mu, target_sd)

Trace

Metropolis–Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}
The image contains a graph with the following components:

- **Top Panel**: A function graph labeled `dnorm(x, target_mu, target_sd)`.
- **Middle Panel**: A trace plot labeled `Trace`.
- **Bottom Panel**: A Metropolis-Hastings plot.
$dnorm(x, \text{target}\_\mu, \text{target}\_sd)$

Trace

Metropolis-Hastings
`dnorm(x, target_mu, target_sd)`
\[ \text{dnorm}(x, \text{target}\_\mu, \text{target}\_sd) \]

Trace

Metropolis-Hastings
The figure illustrates a Metropolis-Hastings algorithm. The top graph shows a normal distribution with a solid line indicating the target distribution and a dashed line indicating the proposal distribution. The middle graph is a trace plot, which tracks the samples drawn from the distribution. The bottom graph depicts the Metropolis-Hastings acceptance ratio, with the solid line representing the target distribution and the dashed line representing the proposal distribution. The samples are accepted if they fall within the target distribution and rejected if they fall outside.
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
$dnorm(x, \text{target\_mu, target\_sd})$

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)

Metropolis–Hastings

Trace

-3  -2  -1  0  1  2  3

-3  -2  -1  0  1  2  3
Metropolis-Hastings
$dnorm(x, \text{target\_mu}, \text{target\_sd})$
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3
dnorm(x, target_mu, target_sd)
\text{dnorm}(x, \text{target\_mu, target\_sd})

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_sd)
Metropolis-Hastings

Trace

dnorm(x, target_mu, target_sd)
$$dnorm(x, \text{target}_\mu, \text{target}_\sigma)$$

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
The diagram illustrates the behavior of a Metropolis-Hastings algorithm in the context of a normal distribution. The top panel shows the target distribution (red solid line) and the proposed distribution (blue dashed line). The middle panel, labeled "Trace," displays the trajectory of the sampler over a range of values for a variable $X$, indicating how the algorithm moves through the parameter space. The bottom panel, labeled "Metropolis-Hastings," provides a visual representation of the acceptance probability, showing how the algorithm decides whether to accept or reject proposed moves based on the target distribution.
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)

\text{Trace}

\text{Metropolis–Hastings}
The diagram shows the trace of a Metropolis-Hastings algorithm with a normal distribution (dnorm) as the target distribution. The trace is plotted against the parameter \( \theta \) ranging from -3 to 3. The red and blue dashed lines represent the target distribution and the samples drawn from the algorithm, respectively. The green dot indicates the starting point of the algorithm.
$dnorm(x, \text{target\_mu}, \text{target\_sd})$
\textbf{Trace}
`dnorm(x, target_mu, target_sd)`

Trace

Metropolis–Hastings
`dnorm(x, target_mu, target_sd)`

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
The diagram shows a plot of a normal distribution function, \( \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \), with the trace of samples from the Metropolis-Hastings algorithm. The trace is represented by a series of black lines that converge towards the target distribution, indicating the sampling process. The horizontal axis represents the parameter \( \chi \) ranging from -3 to 3.
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
The diagram illustrates the trace and Metropolis-Hastings plots for a normal distribution. The trace plot shows the samples drawn from the distribution, while the Metropolis-Hastings plot demonstrates the acceptance of proposals along the target distribution.
The diagram illustrates the Metropolis-Hastings algorithm. The red line represents the target distribution, while the blue line shows the proposal distribution. The trace plot on the middle panel demonstrates the path taken by the algorithm as it samples from the target distribution. The Metropolis-Hastings ratio is depicted in the bottom panel, showing how the algorithm decides whether to accept or reject proposed samples.
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
`dnorm(x, target_mu, target_sd)`
\text{dnorm}(x, \text{target}_\mu, \text{target}_\text{sd})
The diagram illustrates the Metropolis-Hastings algorithm with a target distribution represented by the solid red curve and the proposal distribution represented by the solid blue curve. The trace plot shows the sequence of samples drawn from the target distribution. The Metropolis-Hastings ratio is given by $d\text{norm}(x, \text{target\_mu}, \text{target\_sd})$. 
\text{dnorm}(x, \text{target}_\mu, \text{target}_\text{sd})

trace

Metropolis-Hastings
The diagram illustrates a Markov Chain Monte Carlo (MCMC) process, specifically Metropolis-Hastings, used to sample from a target distribution. The top graph shows the target distribution, likely a normal distribution with mean $\mu$ and standard deviation $\sigma$, denoted as $dnorm(x, \mu, \sigma)$. The middle graph is a trace plot, displaying the sampled values over time, which helps visualize how the chain moves through the parameter space. The bottom graph appears to be the proposal distribution for the Metropolis-Hastings algorithm, which is used to decide whether to accept or reject a proposed move. The green dot indicates a sampled value that is likely accepted based on the comparison with the proposal distribution.
dnorm(x, target_mu, target_sd)

Trace

Metropolis–Hastings

-3 -2 -1 0 1 2 3
The figure depicts the trace plot of a Metropolis-Hastings algorithm. The trace plot shows the evolution of the parameter values over iterations, with the solid line representing the target distribution and the dashed line indicating the proposal distribution. The Metropolis-Hastings algorithm is used to generate samples from a posterior distribution when direct sampling is not feasible. The trace plot helps in assessing the convergence of the algorithm to the target distribution.
\text{dnorm}(x, \text{target}_\mu, \text{target}_sd)
\text{dnorm}(x, \text{target}_\mu, \text{target}_\text{sd})

Trace

Metropolis–Hastings
The diagram illustrates the behavior of the Metropolis-Hastings algorithm, a Markov chain Monte Carlo (MCMC) method. The figure shows a trace plot of the algorithm's iterations (bottom), indicating how the sampler moves through the parameter space over time. The blue line represents the target distribution, while the red line shows the proposal distribution. The Metropolis-Hastings acceptance probability is visualized, demonstrating how the algorithm decides whether to accept or reject a proposed move based on the ratio of the target and proposal densities.
\text{dnorm}(x, \text{target}_\mu, \text{target}_\text{sd})

Trace

Metropolis–Hastings

-3  -2  -1  0  1  2  3
\texttt{dnorm(x, target\_mu, target\_sd)}

\texttt{Trace}

\texttt{Metropolis-Hastings}
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
$$dnorm(x, \text{target}_\mu, \text{target}_\sigma)$$

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
The diagram illustrates a comparison between two distributions:

- **dnorm(x, target_mu, target_sd)** represents a normal distribution with a specified mean (`target_mu`) and standard deviation (`target_sd`).

- The trace and Metropolis-Hastings graphs show the movement of a random walk proposal distribution, indicating how the proposal distribution adapts to the target distribution.
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis–Hastings}
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis–Hastings
The figure illustrates the behavior of the Metropolis-Hastings algorithm for a normal distribution. The red line represents the target distribution, while the blue dashed line shows the proposal distribution. The black lines depict the trace of the algorithm's path, indicating the random walk behavior that explores the parameter space.
d\text{norm}(x, \text{target}\_\mu, \text{target}\_sd)

Trace

Metropolis-Hastings

-3
-2
-1
0
1
2
3
\texttt{dnorm(x, target\_mu, target\_sd)}
$dnorm(x, \text{target}\_\mu, \text{target}\_\sigma)$

Trace

Metropolis–Hastings
Metropolis-Hastings

Trace

dnorm(x, target_mu, target_sd)
\(\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)\)
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
The image shows a graphical representation of a normal distribution function, $dnorm(x, \text{target\_mu}, \text{target\_sd})$, with a solid line and a dashed line indicating the probability density function (PDF) at different points. Below the distribution graph is a trace plot showing the path of samples generated by the Metropolis-Hastings algorithm. The trace plot is overlaid with the normal distribution function to illustrate the sampling process within the target distribution space. The Metropolis-Hastings algorithm is a Markov Chain Monte Carlo (MCMC) method used to generate a sequence of random samples from a probability distribution when direct sampling is difficult.
```
dnorm(x, target_mu, target_sd)
```

**Trace**

**Metropolis–Hastings**
distnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
The diagram illustrates a Metropolis-Hastings algorithm with a target distribution $d\text{norm}(x, \text{target}_\mu, \text{target}_\sigma)$.

- The top panel shows the target distribution.
- The middle panel is a trace plot, indicating the sample paths over multiple iterations.
- The bottom panel displays the acceptance ratio $R$ and the proposal distribution.

The algorithm moves between points on the trace plot, with the dashed line representing the proposed moves and the solid line showing accepted moves.
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis–Hastings}
\text{dnorm}(x, \text{target\_mu, target\_sd})

\begin{align*}
\text{Trace} \\
\text{Metropolis-Hastings}
\end{align*}
The image contains a graph with the following elements:

- **Axes:** The x-axis represents a range of values from -3 to 3, and the y-axis represents the probability density function (PDF) of a normal distribution.

- **PDF Curve:** A smooth curve represents the PDF of a normal distribution, with the formula `dnorm(x, target_mu, target_sd)`.

- **Trace:** A series of black dashed lines represent the trace of a Markov chain, indicating the path of random samples drawn from the distribution.

- **Metropolis-Hastings:** The blue dashed line indicates the proposal distribution, while the green circle marks the acceptance point in the Metropolis-Hastings algorithm.
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
The diagram illustrates a comparison between a normal distribution (dnorm(x, target_mu, target_sd)) and a Metropolis-Hastings algorithm. The trace plot shows the sampling process, highlighting how the algorithm moves through the parameter space. The lower plot compares the target distribution (solid line) with the sampled distribution (dashed line) over a range of values from -3 to 3.
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings
The diagram illustrates the behavior of the Metropolis-Hastings algorithm in a target distribution. The trace plot shows the evolution of the chain over iterations, with each line representing a single sample path. The Metropolis-Hastings acceptance ratio is depicted by the distribution functions, with the solid line representing the target distribution and the dashed line representing the proposed distribution.
\texttt{dnorm(x, target\_mu, target\_sd)}

\texttt{Trace}

\texttt{Metropolis-Hastings}
The image contains a graph with three sections labeled as 'dnorm(x, target_mu, target_sd)', 'Trace', and 'Metropolis-Hastings'. The graph shows a probability density function (PDF) with a normal distribution centered around a target mean (mu) and standard deviation (sd). The 'Trace' section displays a series of horizontal lines, likely representing sampled values or parameter trajectories over time. The 'Metropolis-Hastings' section shows a PDF with a solid and a dashed line, indicating the proposal and acceptance distributions, respectively. The vertical line 'q' denotes a specific point of interest on the distribution.
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

-3 -2 -1 0 1 2 3

Trace

Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}
The diagram illustrates the `dnorm` function with parameters `target_mu` and `target_sd`. The trace plot shows the path of the sampling process, and the Metropolis-Hastings acceptance rates are indicated by the solid and dashed lines. The x-axis ranges from -3 to 3.
```
dnorm(x, target_mu, target_sd)
```

Trace

Metropolis-Hastings
$dnorm(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis–Hastings
\[ dnorm(x, \text{target}_{\mu}, \text{target}_{sd}) \]
\textbf{dnorm(x, target\_mu, target\_sd)}

\textbf{Trace}

\textbf{Metropolis-Hastings}
The image shows a plot with the following elements:

- **Trace**: A vertical line showing the trace of the Markov chain. The trace appears to have visited the target distribution efficiently, with a smooth path moving through the parameter space.

- **Metropolis-Hastings**: The distribution of the Metropolis-Hastings sampler is shown, indicating the proposal distribution used for the sampler.

- **dnorm(x, target_mu, target_sd)**: This represents the density function of the normal distribution with parameters mu and sd, as indicated by the title of the plot. The red line represents the target distribution, while the blue dashed line represents the proposal distribution.
The image contains a graph illustrating the function \( dnorm(x, \text{target\_mu}, \text{target\_sd}) \) and a trace plot. The graph shows the distribution with a normal curve. The trace plot represents the path taken by the sampling process, with Metropolis-Hastings steps indicated. The x-axis ranges from -3 to 3, and the y-axis shows the density or probability distribution of the sampled values.
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3

-3 -2 -1 0 1 2 3
\texttt{dnorm(x, target\_mu, target\_sd)}

\begin{align*}
\text{Trace} \\
\text{Metropolis-Hastings}
\end{align*}
dnorm(x, target_mu, target_sd)
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis-Hastings
$dnorm(x, target\_mu, target\_sd)$

Trace

Metropolis-Hastings
Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings
The graph shows a probability density function (PDF) of a normal distribution, denoted as \( \text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma) \), and a trace plot of a sample sequence generated using the Metropolis-Hastings algorithm.

- The \( \text{dnorm} \) curve represents the target distribution.
- The trace plot illustrates the sequence of samples generated by the algorithm, showing how the samples are distributed across the parameter space.
- The Metropolis-Hastings algorithm is used to sample from a complex distribution, often when direct sampling is difficult or impossible.
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
$$dnorm(x, \text{target}_\mu, \text{target}_\sigma)$$

Trace

Metropolis–Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

\texttt{Trace}

\texttt{Metropolis-Hastings}
$\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})$
$$dnorm(x, target\_mu, target\_sd)$$
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis–Hastings
$$dnorm(x, \text{target\_mu, target\_sd})$$

Trace

Metropolis-Hastings
The diagram illustrates a normal distribution function, denoted as $\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})$. The trace plot shows the sampling path of the Metropolis-Hastings algorithm over several iterations. The Metropolis-Hastings algorithm is a Markov Chain Monte Carlo (MCMC) method used to obtain a sequence of samples from a probability distribution. The algorithm iteratively samples from a proposal distribution and accepts or rejects these samples based on their probability, ensuring that the samples converge to the desired distribution.
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
$dnorm(x, \text{target}\_mu, \text{target}\_sd)$

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\begin{align*}
\text{Trace} \\
\text{Metropolis-Hastings}
\end{align*}

\begin{align*}
-3 & \quad -2 & \quad -1 & \quad 0 & \quad 1 & \quad 2 & \quad 3 \\
-3 & \quad -2 & \quad -1 & \quad 0 & \quad 1 & \quad 2 & \quad 3
\end{align*}
The diagram illustrates a normal distribution (dnorm) with target parameters, as well as a trace plot (Trace) of a Metropolis-Hastings algorithm. The Metropolis-Hastings distribution (Metropolis-Hastings) is shown with solid and dashed lines.
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis–Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis–Hastings

\begin{align*}
-3 & \quad -2 & \quad -1 & \quad 0 & \quad 1 & \quad 2 & \quad 3
\end{align*}
The diagram illustrates the behavior of a Metropolis-Hastings algorithm in a target distribution. The trace plot shows the sampled states over iterations, indicating how the algorithm transitions between states. The Metropolis-Hastings acceptance ratio is also depicted, highlighting the decision process for accepting or rejecting new states. The distributions involved are denoted as `dnorm(x, target_mu, target_sd)`, indicating a normal distribution with mean `target_mu` and standard deviation `target_sd`. The algorithm aims to approximate the target distribution through successive sampling and acceptance steps.
\texttt{dnorm(x, target_mu, target_sd)}

Trace

Metropolis-Hastings
$dnorm(x, \text{target}_{\mu}, \text{target}_{sd})$
`dnorm(x, target_mu, target_sd)`

Trace

Metropolis-Hastings
$dnorm(x, \text{target}_\mu, \text{target}_\sigma)$

Trace

Metropolis-Hastings
The diagram illustrates the Metropolis-Hastings algorithm. The top part shows the density function (dnorm) with parameters `target_mu` and `target_sd`. The middle part displays the trace of the sampling process, indicating the path taken by the algorithm. The bottom part depicts the Metropolis-Hastings acceptance ratio, which determines whether a proposed value is accepted or rejected.
$dnorm(x, \text{target}_\mu, \text{target}_{sd})$

Trace

Metropolis–Hastings
The diagram illustrates the behavior of the Metropolis-Hastings algorithm in a simplified context. The top plot shows the target distribution (solid red line) and a proposal distribution (dashed blue line) overlapping. The middle plot represents the trace of the Markov chain over iterations, showing how samples are drawn from the target distribution. The bottom plot focuses on the Metropolis-Hastings acceptance ratio, indicating the transition probabilities between states. The variables `x`, `target_mu`, and `target_sd` are used in the context of the distribution functions to demonstrate the algorithm's performance.
The image shows a plot of a normal distribution function $dnorm(x, \text{target}_\mu, \text{target}_\sigma)$ with parameters $\mu$ and $\sigma$ indicating the mean and standard deviation, respectively.

The middle part of the image represents the trace plot of a Markov chain, illustrating the path taken by the chain during its iterations.

The bottom part of the image demonstrates the Metropolis-Hastings algorithm, showing how the chain moves through the parameter space, trying to explore the posterior distribution.
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
$dnorm(x, \text{target}_\mu, \text{target}_sd)$

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)$

\text{Trace}

\text{Metropolis-Hastings}$
\texttt{dnorm(x, target\_mu, target\_sd)}

\texttt{Trace}

\texttt{Metropolis-Hastings}
$$dnorm(x, \text{target\_mu, target\_sd})$$
\text{norn}(x, \text{target}_\mu, \text{target}_{sd})

Trace

Metropolis-Hastings

\(x\)
```
dnorm(x, target_mu, target_sd)
```

**Trace**

**Metropolis-Hastings**
\texttt{dnorm(x, target\_mu, target\_sd)}

\textbf{Trace}

\textbf{Metropolis-Hastings}
`dnorm(x, target_mu, target_sd)`

**Trace**

**Metropolis-Hastings**
The image contains a diagram with the following elements:

- The top graph represents a normal distribution function with the equation `dnorm(x, target_mu, target_sd)`.
- The middle graph shows a trace plot, indicating the path taken by the Markov chain in the parameter space.
- The bottom graph illustrates the Metropolis-Hastings algorithm, showing the acceptance and rejection of candidate moves based on the target distribution.
\text{dnorm}(x, \text{target\_mu, target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
\[ \text{dnorm}(x, \text{target} \_\mu, \text{target} \_\sigma) \]

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]

Trace

Metropolis-Hastings
\( \text{dnorm}(x, \text{target}\_\mu, \text{target}\_sd) \)

Trace

Metropolis-Hastings

\( -3 \quad -2 \quad -1 \quad 0 \quad 1 \quad 2 \quad 3 \)
\text{dnorm}(x, \text{target}\_\mu, \text{target}\_sd)
Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3  -2  -1  0  1  2  3
\text{dnorm}(x, \text{target\_mu, target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
dnorm(x, target_mu, target_sd)
The diagram illustrates a Metropolis-Hastings algorithm with a target distribution (solid red line) and the proposal distribution (dashed blue line). The trace plot shows the samples drawn from the target distribution, demonstrating the movement of the sampling process. The Metropolis-Hastings acceptance ratio is calculated based on the log of the ratio of the target distribution densities at the current and proposed states.
The diagram illustrates the Metropolis-Hastings algorithm. The top panel shows a normal distribution with a solid red line. The middle panel displays a trace plot, which tracks the evolution of the Markov chain. The bottom panel contrasts the target distribution (solid black line) with the proposal distribution (dashed blue line). The traces are aligned with the target distribution, indicating that the algorithm has converged to the desired distribution.
\text{dnorm}(x, \text{target}_\mu, \text{target}_\text{sd})

\begin{align*}
\text{Track} & \quad \text{Trace} \\
\text{Metropolis-Hastings} & \quad \text{Metropolis-Hastings}
\end{align*}
```r
dnorm(x, target_mu, target_sd)
```
\[ d\text{norm}(x, \text{target}_\mu, \text{target}_sd) \]
The diagram illustrates the usage of the `dnorm` function, specifically `dnorm(x, target_mu, target_sd)`.

- **Trace**: This represents the trace plots of the samples from the Metropolis-Hastings algorithm. The dense lines indicate the sampled values over iterations, with the density of lines reflecting the concentration of samples.

- **Metropolis-Hastings**: This section shows the proposal distribution and the target distribution. The solid line is the target distribution, and the dashed line represents the proposal distribution. The current state is indicated by the green circle, and the acceptance probability is determined by the overlap of the two distributions at this point.

The diagram effectively visualizes the exploration of the parameter space through the Metropolis-Hastings algorithm, with a focus on the distribution of samples and the acceptance criteria.
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
The image contains a graph with the function `dnorm(x, target_mu, target_sd)` plotted over a range of `x` values from -3 to 3. The graph also includes a trace plot and a Metropolis-Hastings diagram, indicating the sampling process in a Bayesian context.
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings
$dnorm(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3
$dnorm(x, target_mu, target_sd)$

Trace

Metropolis–Hastings

-3  -2  -1  0  1  2  3
The image contains a graph illustrating a normal distribution function, `dnorm(x, target_mu, target_sd)`, with two examples shown:

- The solid red line represents a normal distribution with a specific `target_mu` and `target_sd`.
- The dashed blue line represents another normal distribution with different parameters.

The graph also includes a trace plot labeled `Trace` and a Metropolis-Hastings trajectory labeled `Metropolis-Hastings`.
\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]

Trace

Metropolis–Hastings

\(-3\) \(-2\) \(-1\) 0 1 2 3
The diagram illustrates a function `dnorm(x, target_mu, target_sd)` which is a normal distribution density function.

- **Trace**: The trace plot shows the sampling process over time, with each line representing a single sample path from the distribution.
- **Metropolis–Hastings**: The Metropolis–Hastings algorithm is a Markov chain Monte Carlo (MCMC) method used to sample from a probability distribution. The plot shows the movement of samples over iterations, with the red line indicating the target distribution and the blue line representing the proposal distribution.
The image shows a plot of a probability density function (PDF) for a normal distribution. The PDF is given by the function `dnorm(x, target_mu, target_sd)`. The plot includes a trace of the Metropolis-Hastings algorithm, which is used for sampling from probability distributions. The trace shows the sequence of samples generated by the algorithm, with the dotted line representing the proposal distribution and the solid line representing the target distribution. The x-axis represents the values of the variable, and the y-axis shows the density of the distribution.
The figure illustrates the Metropolis-Hastings algorithm using a normal distribution. The top graph shows the density function for a normal distribution with parameters $\mu$ and $\sigma$. The trace plot in the center demonstrates the sequence of samples generated by the algorithm over iterations. The bottom graph, titled 'Metropolis-Hastings', further visualizes the acceptance ratio, with the solid line representing the target distribution and the dashed line the proposal distribution.
$dnorm(x, \text{target}_\mu, \text{target}_sd)$

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis–Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)$

Trace

Metropolis–Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_\text{sd})

\text{Trace}

\text{Metropolis-Hastings}
The diagram illustrates the use of the Metropolis-Hastings algorithm in Bayesian inference. The top panel shows the target distribution density function, $dnorm(x, target\_mu, target\_sd)$, with the solid line representing the distribution density and the dashed line representing the proposal distribution.

The middle panel displays the trace of the sampler, indicating the progression of samples over iterations. The bottom panel shows the Metropolis-Hastings acceptance ratio, with the solid line representing the target distribution and the dashed line representing the proposal distribution.
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
Metropolis–Hastings
\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]
$dnorm(x, \text{target\_mu}, \text{target\_sd})$
dnorm(x, target_mu, target_sd)

Trace

Metropolis–Hastings

-3 -2 -1 0 1 2 3

-3 -2 -1 0 1 2 3

[Graph showing a normal distribution curve and a trace plot with Metropolis–Hastings algorithm]
The diagram illustrates the Metropolis-Hastings algorithm with a target distribution shown as a solid red line and the proposal distribution as a dashed blue line. The trace plot below shows the samples drawn from the target distribution, indicating the path taken by the algorithm over iterations. The Metropolis-Hastings acceptance ratio is represented by the green dot at the origin.
The image contains a graph with two distributions, one solid and one dashed. The solid distribution is labeled as 'dnorm(x, target_mu, target_sd)' and the dashed distribution is additionally labeled as 'Track'. The axis labeled 'Metropolis-Hastings' shows a series of traces that appear to follow the distributions. The x-axis ranges from -3 to 3.
$dnorm(x, \text{target}_\mu, \text{target}_sd)$

Trace

Metropolis–Hastings
```r
dnorm(x, target_mu, target_sd)
```

**Trace**

**Metropolis−Hastings**
The image contains a graph with the title "dnorm(x, target_mu, target_sd)". The graph shows a distribution curve labeled as trace, with a horizontal axis ranging from -3 to 3. There are two overlays on the graph, one in red and one in blue, indicating different distributions or samples. The x-axis is labeled as "x", and the y-axis is partially obscured but appears to represent the probability density function. Below the trace, there is another graph labeled "Metropolis-Hastings" with similar distribution curves, but with a different scale or range, indicated by the labels "-3" to "3" on the x-axis.
`dnorm(x, target_mu, target_sd)`

Trace

Metropolis–Hastings
animate

$dnorm(x, \text{target}_\mu, \text{target}_\sigma)$

Trace

Metropolis–Hastings
$$dnorm(x, \text{target\_mu}, \text{target\_sd})$$

Trace

Metropolis-Hastings
\[ \text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma) \]
$dnorm(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis–Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
The figure illustrates the Metropolis-Hastings (M-H) algorithm for sampling from a target distribution. The top panel shows the target distribution (solid red line) and the proposal distribution (dashed blue line). The middle panel is a trace plot of the M-H algorithm, demonstrating how the algorithm moves through the parameter space. The bottom panel shows the acceptance ratio, indicating the probability of accepting a move from the current state (solid black line) to the proposed state (dashed blue line).
The diagram illustrates the trace plot and Metropolis-Hastings sampling process for a normal distribution with target mean and standard deviation. The trace plot shows the sampled values, while the Metropolis-Hastings distribution is visualized with smooth curves.
Metropolis–Hastings

\[ d \text{norm}(x, \text{target\_mu}, \text{target\_sd}) \]
dnorm(x, target_mu, target_sd)

Trace

Metropolis–Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis–Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis–Hastings
$dnorm(x, \text{target}_\mu, \text{target}_sd)$

Trace

Metropolis–Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}
\text{dnorm}(x, \text{target}_\mu, \text{target}_sd)
Metropolis-Hastings

dnorm(x, target_mu, target_sd)

Trace

-3 -2 -1 0 1 2 3

-3 -2 -1 0 1 2 3
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis–Hastings
dnorm(x, target_mu, target_sd)
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
The diagram illustrates the probability density function (PDF) of a normal distribution with mean \( \mu \) and standard deviation \( \sigma \), denoted as \( \text{dnorm}(x, \mu, \sigma) \). The trace plot shows the sampled values from a Metropolis-Hastings algorithm, indicating the evolution of the sampler over iterations. The Metropolis-Hastings distribution, shown in blue dashed lines, is used to propose new values in each iteration. The green dot represents the starting point of the sampling process, and the sampler moves along the path indicated by the black lines, aiming to explore the target distribution efficiently.
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
The image displays a graph with the following elements:

- The top graph shows the density function `dnorm(x, target_mu, target_sd)`.
- The middle graph illustrates the trace of a Markov Chain Monte Carlo (MCMC) simulation.
- The bottom graph demonstrates the Metropolis-Hastings algorithm, with a line representing the target distribution and another line showing the proposed distribution.
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
\texttt{dnorm(x, target\_mu, target\_sd)}

\textbf{Trace}

\textbf{Metropolis–Hastings}
$dnorm(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis–Hastings
`dnorm(x, target_mu, target_sd)`
dnorm(x, target_mu, target_sd)
$$dnorm(x, \text{target}_\mu, \text{target}_sd)$$

Trace

Metropolis–Hastings
\text{dnorm}(x, \text{target} \_\mu, \text{target} \_\sigma)
\texttt{dnorm(x, target\_mu, target\_sd)}
The graph shows a normal distribution with a solid red line representing the true distribution and a dashed blue line representing the estimated distribution. The trace plot below the density plot illustrates the samples drawn from the Metropolis-Hastings algorithm, where the green dot indicates the starting point.

The Metropolis-Hastings algorithm is a Markov Chain Monte Carlo (MCMC) method used to obtain a sequence of samples from a probability distribution, in this case, the normal distribution. The algorithm iteratively proposes new samples and accepts or rejects them based on the ratio of the target distribution to the proposal distribution.

The trace plot demonstrates the exploration of the parameter space, with the samples hinting at the convergence to the true distribution. The Metropolis-Hastings algorithm is particularly useful for sampling from distributions that are difficult to sample from directly, such as those with complex modes or high dimensions.
\text{dnorm}(x, \text{target}_\mu, \text{target}_\text{sd})

Trace

Metropolis–Hastings

-3
-2
-1
0
1
2
3
$dnorm(x, \text{target}_\mu, \text{target}_\sigma)$

Trace

Metropolis–Hastings
The image contains a plot of the function $dnorm(x, \text{target}_\mu, \text{target}_sd)$.

The plot includes:
- A graph of the function $dnorm(x, \text{target}_\mu, \text{target}_sd)$.
- A trace plot of the simulation.
- A Metropolis-Hastings trajectory.

The trace plot and Metropolis-Hastings trajectory are overlaid on the function graph, showing the distribution of samples drawn from the normal distribution with parameters $\text{target}_\mu$ and $\text{target}_sd$.
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\[ \text{dnorm}(x, \text{target}_\mu, \text{target}_\text{sd}) \]
The diagram illustrates the Metropolis-Hastings algorithm, a Markov Chain Monte Carlo (MCMC) method used for sampling from a probability distribution. The top panel shows the target distribution, denoted as $\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})$. The middle panel depicts the trace of the sampling process, which is a visual representation of the values the algorithm generates. The bottom panel illustrates the Metropolis-Hastings acceptance ratio, comparing the target distribution with the proposal distribution.
dnorm(x, target_mu, target_sd)
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis–Hastings
$dnorm(x, \text{target}\_\mu, \text{target}\_sd)$

Trace

Metropolis–Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\begin{align*}
\text{Trace} \\
\text{Metropolis–Hastings}
\end{align*}
The image shows a plot with the following components:

- The top graph represents the normal distribution function `dnorm(x, target_mu, target_sd)`.
- The middle graph is a trace plot, indicating the path of samples generated by the Metropolis-Hastings algorithm.
- The bottom graph depicts the Metropolis-Hastings acceptance ratio.

The x-axis ranges from -3 to 3, and the y-axis is not explicitly labeled but correlates with the density function and acceptance ratio graphs.
$$dnorm(x, \text{target}_\mu, \text{target}_sd)$$

Trace

Metropolis–Hastings
\( \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \)

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3

-3 -2 -1 0 1 2 3
\[ \text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma) \]

Trace

Metropolis–Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
$\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)$
\texttt{dnorm(x, target\_mu, target\_sd)}

\texttt{Trace}

\texttt{Metropolis-Hastings}
\[ d\text{norm}(x, \text{target}\_\mu, \text{target}\_\text{sd}) \]
dnorm(x, target_mu, target_sd)

Trace

Metropolis–Hastings
$dnorm(x, \text{target}_\mu, \text{target}_\sigma)$

Trace

Metropolis-Hastings
\texttt{dnorm(x, target_mu, target_sd)}
dnorm(x, target_mu, target_sd)

Metropolis-Hastings

Trace
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)$

\begin{align*}
\text{trace} & \quad -3 \quad -2 \quad -1 \quad 0 \quad 1 \quad 2 \quad 3 \\
\text{Metropolis-Hastings} & 
\end{align*}
\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)\n\text{Trace}\n\text{Metropolis–Hastings}
dnorm(x, target_mu, target_sd)
\[ \text{dnorm}(x, \text{target}_\mu, \text{target}_{sd}) \]

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu, target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
$dnorm(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis–Hastings
The diagram shows a comparison of two normal distributions, denoted as `dnorm(x, target_mu, target_sd)`.

- The red line represents the target distribution.
- The blue dashed line represents the proposal distribution.

Below the distribution plots, there is a trace plot illustrating the samples generated by the Metropolis-Hastings algorithm. The trace plot shows the evolution of the Markov chain, with the initial value marked as a green dot.
\texttt{dnorm(x, target\_mu, target\_sd)}

\textit{Trace}

\textit{Metropolis-Hastings}
\text{dnorm}(x, \text{target}_\mu, \text{target}_\text{sd})
$dnorm(x, \text{target\_mu, target\_sd})$

Trace

Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}
The image depicts a graph illustrating a distribution of data points. The graph shows a normal distribution curve labeled `dnorm(x, target_mu, target_sd)` with two different curves represented by solid and dashed lines. The x-axis is labeled with values ranging from -3 to 3, and the y-axis is not labeled. The graph also includes a trace plot that visualizes the sampling process of a Metropolis-Hastings algorithm, with trajectories indicating the movement of samples over iterations.
dnorm(x, target_mu, target_sd)

Trace

Metropolis–Hastings

-3 -2 -1 0 1 2 3
$d\text{norm}(x, \text{target\_mu}, \text{target\_sd})$
dnorm(x, target_mu, target_sd)
The diagram illustrates the Metropolis-Hastings algorithm. The top plot shows the target distribution (dashed line) and the proposal distribution (solid line). The middle plot is a trace plot, which tracks the samples drawn from the posterior distribution. The bottom plot compares the target and proposal distributions. The Metropolis-Hastings algorithm is used to generate samples from a target distribution when direct sampling is difficult. The algorithm involves proposing a new sample and accepting it based on the ratio of the target densities.

The function `dnorm(x, target_mu, target_sd)` is used to calculate the density of the normal distribution with mean `target_mu` and standard deviation `target_sd`.
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\begin{align*}
\text{Trace} \\
\text{Metropolis-Hastings}
\end{align*}
$dnorm(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)
\[ \text{dnorm}(x, \text{target}_\text{mu}, \text{target}_\text{sd}) \]
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
\[ d\text{norm}(x, \text{target\_mu}, \text{target\_sd}) \]
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
The diagram illustrates a Metropolis-Hastings algorithm with two target distributions. The top panel shows a normal distribution (dnorm function) with a solid line for the target distribution and a dashed line for the proposal distribution. The middle panel is a trace plot showing the sample path of the Markov chain. The bottom panel displays the acceptance ratio with a solid line for the proposed distribution and a dashed line for the target distribution.
\[ \text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma) \]

**Trace**

**Metropolis-Hastings**
The diagram illustrates the Metropolis-Hastings algorithm. The top graph shows the target distribution, while the bottom graph depicts the proposal distribution. The trace plot in the middle displays the samples generated by the algorithm.
$$dnorm(x, \text{target\_mu}, \text{target\_sd})$$
The diagram illustrates the relationship between the target distribution and the proposal distribution in the context of Metropolis-Hastings sampling. The top panel shows the target distribution (solid red line) and the proposal distribution (dashed blue line). The middle panel is a trace plot of the samples drawn from the posterior distribution. The bottom panel demonstrates the Metropolis-Hastings acceptance and rejection criteria, where the solid line indicates the target distribution, and the dashed line represents the proposal distribution. The vertical dotted lines indicate the proposed and accepted values. The parametric representation of the target distribution is given by `dnorm(x, target_mu, target_sd)`. The parameters can be set appropriately for various applications.
\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]
The image shows a graph with the function $\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)$ plotted. The graph includes a trace plot and a Metropolis-Hastings plot. The trace plot shows a series of lines indicating the samples drawn from the distribution. The Metropolis-Hastings plot demonstrates the movement of the sampling process over the target distribution.
The image contains a graph with the following characteristics:

- The graph is labeled with `dnorm(x, target_mu, target_sd)` indicating it is a normal distribution function.
- The x-axis is labeled with `T race` showing the trace of the Metropolis-Hastings algorithm.
- The y-axis is labeled with `Metropolis-Hastings` showing the distribution of the samples.
- The graph includes a normal distribution curve and a trace plot representing the sampling process.
- The trace plot shows the movement of the sampling process over iterations, with the Metropolis-Hastings algorithm improving the sampling efficiency.
dnorm(x, target_mu, target_sd)
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis-Hastings
The diagram illustrates the behavior of the Metropolis-Hastings algorithm in a Bayesian context. The top plot shows the target distribution (solid red line) and the proposal distribution (dashed blue line). The middle plot is the trace of the Markov chain, indicating the path taken by the algorithm. The bottom plot compares the target distribution with the estimated distribution, highlighting the convergence to the target distribution.
\text{dnorm}(x, \text{target}_\mu, \text{target}_sd)
```
dnorm(x, target_mu, target_sd)
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Trace

Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

\textbf{Trace}

\textbf{Metropolis-Hastings}
\text{dnorm}(x, \text{target}_\mu, \text{target}_\text{sd})

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3
The diagram shows the comparison of the normal distribution function `dnorm(x, target_mu, target_sd)` with two different parameter sets. The solid red line represents one set of parameters, and the dashed blue line represents another set. The top panel displays the probability density function, the middle panel shows the trace plot, and the bottom panel illustrates the Metropolis-Hastings algorithm, with the solid line indicating the target distribution and the dashed line showing the candidate distribution.
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings
$dnorm(x, \text{target}_\mu, \text{target}_\sigma)$

Trace

Metropolis-Hastings
\textbf{Metropolis-Hastings}

\textbf{Trace}

dnorm(x, \text{target\_mu, target\_sd})
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3
The graph shows a normal distribution function, denoted as $dnorm(x, \text{target}_\mu, \text{target}_\sigma)$, along with a trace plot and a Metropolis-Hastings proposal distribution. The trace plot illustrates the sampling process, with the Metropolis-Hastings proposal indicating the potential moves from one sample to another. The distribution is centered around $\mu$, with variation controlled by $\sigma$. The trace plot's density suggests a thorough exploration of the parameter space.
$dnorm(x, \text{target}_\mu, \text{target}_sd)$

Trace

Metropolis–Hastings

$-3  \quad -2  \quad -1  \quad 0  \quad 1  \quad 2  \quad 3$
\text{dnorm}(x, \text{target}\_\text{mu}, \text{target}\_\text{sd})
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
$dnorm(x, \text{target}_\mu, \text{target}_sd)$
$$dnorm(x, \text{target\_mu}, \text{target\_sd})$$
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
$d\text{norm}(x, \text{target}_\text{mu}, \text{target}_\text{sd})$
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dnorm(x, target_mu, target_sd)
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**Trace**

**Metropolis–Hastings**
dnorm(x, target_mu, target_sd)
$$dnorm(x, target\_mu, target\_sd)$$

Trace

Metropolis–Hastings
\text{dnorm}(x, \text{target\_mu, target\_sd})
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
A graph showing a normal distribution curve, labeled `dnorm(x, target_mu, target_sd)` at the top. Below, a trace plot of sampled values from a Metropolis-Hastings algorithm, with a vertical line indicating the target mean value. At the bottom, a Metropolis-Hastings acceptance ratio, comparing the target distribution to the proposal distribution.
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\texttt{dnorm(x, target\_mu, target\_sd)}
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
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dnorm(x, target_mu, target_sd)
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Trace
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Metropolis-Hastings
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The graph illustrates the Metropolis-Hastings algorithm. The top graph shows the target density (solid red line) and the proposal density (dashed blue line). The middle graph is a trace plot of the samples generated by the algorithm. The bottom graph compares the target density with the sampled distribution, indicating the efficiency of the proposal distribution in approximating the target distribution.
The graph shows a comparison of two normal distributions with different parameters. The solid red line represents the target distribution, while the dashed blue line represents the proposal distribution. The trace plot in the middle demonstrates the path taken by the sampling process, with the Metropolis-Hastings algorithm shown at the bottom. The x-axis represents values from -3 to 3.
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \quad \text{Trace} \quad \text{Metropolis–Hastings}
$dnorm(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis-Hastings
The image shows a graph with a normal distribution curve labeled `dnorm(x, target_mu, target_sd)`. The curve is overlaid with a trace plot indicating the sampling process, and a Metropolis–Hastings plot is also present. The x-axis ranges from -3 to 3, with marked values at -2, -1, 0, 1, 2, and 3.
$$d\text{norm}(x, \text{target\_mu}, \text{target\_sd})$$
The image contains a graph with the following elements:

- The top part shows the normal distribution function (dnorm) with two curves: one solid red line and one dashed blue line. The solid red line is the target distribution, and the dashed blue line is the proposal distribution.

- The middle part is labeled as "Trace" and shows a trace plot of the sampling process over several iterations. The plot indicates a sequence of samples from a distribution.

- The bottom part is labeled as "Metropolis-Hastings" and displays theMetropolis-Hastings algorithm with a solid black line representing the target distribution and a dashed blue line representing the proposal distribution. The plot shows the movement of the sampling process from an initial point (green dot) towards the target distribution (red line).
\text{dnorm}(x, \text{target}_\mu, \text{target}_sd)

\text{Trace}

\text{Metropolis-Hastings}
$$dnorm(x, \text{target}\_\mu, \text{target}\_sd)$$
The image contains a graph with a normal distribution curve and a trace plot. The normal distribution curve is labeled as `dnorm(x, target_mu, target_sd)`.
$dnorm(x, \text{target\_mu, target\_sd})$
$dnorm(x, \text{target\_mu}, \text{target\_sd})$
\text{dnorm}(x, \text{target}_\text{mu}, \text{target}_\text{sd})
\texttt{dnorm(x, target\_mu, target\_sd)}

\textbf{Trace}

\textbf{Metropolis-Hastings}
```
dnorm(x, target_mu, target_sd)
```

**Trace**

**Metropolis-Hastings**
$dnorm(x, \text{target\_mu, target\_sd})$

Trace

Metropolis-Hastings
$dnorm(x, \text{target}_\mu, \text{target}_sd)$

Trace

Metropolis-Hastings
The figure illustrates the Metropolis-Hastings algorithm. The top panel shows the target distribution (dotted line) and the proposal distribution (solid line). The middle panel is the trace plot, which tracks the evolution of the chain over iterations. The bottom panel displays the acceptance rate for the Metropolis-Hastings algorithm, with the green dot indicating the acceptance of a proposal.
The image depicts a graph showing the distribution of a variable $x$ with a normal distribution $\text{dnorm}(x, \text{target}_\mu, \text{target}_\text{sd})$. The trace plot for the Metropolis-Hastings algorithm is also shown, with the variable $x$ ranging from $-3$ to $3$. The algorithm's trajectory is visualized with a series of lines, indicating the movement of the variable over iterations. The Metropolis-Hastings distribution is illustrated with a solid black line, while the proposed distribution is shown with a dashed blue line. The optimal value of $\mu$ is indicated by a green dot at $x = 1$. The graph provides insights into the sampling process and the convergence of the Metropolis-Hastings algorithm to the target distribution.
The image shows a graph of a normal distribution function (dnorm) with parameters specified as $x$, $target\_mu$, and $target\_sd$. The graph includes a trace plot (Trace) that illustrates the path of samples generated by a Metropolis-Hastings algorithm. The Metropolis-Hastings algorithm is a Markov Chain Monte Carlo (MCMC) method used for sampling from a probability distribution. The trace plot provides insight into the convergence of the sampling process, indicating how closely the generated samples match the target distribution.
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings
$$dnorm(x, \text{target\_mu}, \text{target\_sd})$$

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_sd)
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis–Hastings
$d \text{norm}(x, \text{target}_{\mu}, \text{target}_{\sigma})$

Trace

Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}
$dnorm(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis-Hastings
The diagram shows the Metropolis-Hastings algorithm in action. The top plot illustrates the density function `dnorm(x, target_mu, target_sd)` with two normal distributions: one solid red line and one dashed blue line. The middle plot is the trace plot, showing the sample path of the Markov chain. The bottom plot is the Metropolis-Hastings acceptance probability distribution. The diagram also highlights the transition from one state to another, demonstrating the algorithm's ability to explore the parameter space efficiently.
$dnorm(x, target\_mu, target\_sd)$

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis–Hastings}
Metropolis–Hastings

\[ \text{dnorm}(x, \text{target}\_\text{mu}, \text{target}\_\text{sd}) \]
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3  -2  -1  0  1  2  3
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings
$dnorm(x, \text{target}_\mu, \text{target}_\sigma)$

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)
$\text{dnorm}(x, \text{target}\_\mu, \text{target}\_\sigma)$

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis–Hastings
$dnorm(x, \text{target}\_\mu, \text{target}\_sd)$

**Trace**

**Metropolis-Hastings**

$-3 \quad -2 \quad -1 \quad 0 \quad 1 \quad 2 \quad 3$
dnorm(x, target.mu, target.sd)

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3
\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]
The graph shows a normal distribution curve with a target mu and target sd. The trace plot displays the sampling path of the Metropolis-Hastings algorithm. The Metropolis-Hastings acceptance probability is illustrated below the trace plot.
$$\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})$$

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]
$$dnorm(x, \text{target}\_\mu, \text{target}\_sd)$$

Trace

Metropolis-Hastings
\textbf{dnorm}(x, \text{target}_{\text{mu}}, \text{target}_{\text{sd}})
The image shows a diagram with three graphs:

1. **dnorm(x, target_mu, target_sd)**: This graph represents the probability density function of a normal distribution with mean `target_mu` and standard deviation `target_sd`. The solid red line indicates the true distribution, while the dashed blue line represents an approximation.

2. **Trace**: This graph displays a trace plot of a Markov Chain Monte Carlo (MCMC) simulation. The trace plot shows the sequence of samples generated by the MCMC algorithm, which can be used to assess the convergence of the simulation.

3. **Metropolis-Hastings**: This graph illustrates the Metropolis-Hastings algorithm, a method for sampling from a probability distribution. The solid line represents the target distribution, and the dashed line shows the proposed distribution. The green dot indicates the starting point of the simulation, and the trajectory of the chain is visualized as a series of black lines.

The x-axis ranges from -3 to 3, and the y-axis is not explicitly labeled but seems to correspond to the density or probability values.
The image shows a graph with the following components:

- **dnorm(x, target.mu, target.sd)**: This represents a probability density function (PDF) for a normal distribution. The PDF is a smooth curve that shows the relative likelihood for a continuous random variable to take on a given value.

- **Trace**: This is a trace plot that displays the evolution of the samples drawn from the posterior distribution. Each line represents a sample path over time, showing how the samples change as the Metropolis-Hastings algorithm progresses.

- **Metropolis-Hastings**: This is an algorithm used for sampling from a probability distribution. The diagram illustrates how the samples are drawn by proposing new points and deciding whether to accept or reject them based on the Metropolis-Hastings acceptance ratio.

The x-axis ranges from -3 to 3, and the y-axis represents the density of the normal distribution. The trace plot shows a dense sampling of points, indicating a well-mixed and thoroughly sampled posterior distribution.
$dnorm(x, \text{target\_mu}, \text{target\_sd})$
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis–Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis–Hastings
$dnorm(x, \text{target}_\mu, \text{target}_sd)$

Trace

Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

\textbf{Trace}

\textbf{Metropolis–Hastings}
The image shows a graph with two normal distributions. The solid red line represents the target distribution, and the dashed blue line represents the proposal distribution. The graph includes a trace plot and Metropolis-Hastings updates. The x-axis ranges from -3 to 3.
\text{dnorm}(x, \text{target}_\text{mu}, \text{target}_\text{sd})

\text{Trace}

\text{Metropolis-Hastings}
$$\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)$$
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
$$dnorm(x, \text{target}_\mu, \text{target}_\sigma)$$

Trace

Metropolis-Hastings
$dnorm(x, \text{target\_mu, target\_sd})$

Trace

Metropolis–Hastings

-3 -2 -1 0 1 2 3
dnorm(x, target_mu, target_sd)
$dnorm(x, \text{target\_mu}, \text{target\_sd})$
\text{dnorm}(x, \text{target\_mu, target\_sd})
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
$dnorm(x, \text{target}_\mu, \text{target}_sd)$
The image shows a graph with two distributions: one solid red line and one dashed blue line. The x-axis is labeled with values from -3 to 3. The y-axis is labeled with the function `dnorm(x, target_mu, target_sd)`. The graph also includes a trace plot below the distributions, and a Metropolis-Hastings plot at the bottom. The trace plot indicates the movement of samples drawn from the distributions, and the Metropolis-Hastings plot shows the acceptance of proposals based on the target distribution.
The image shows a graph with the following elements:

- The top graph represents the density function `dnorm(x, target_mu, target_sd)`.
- The middle graph is a trace plot indicating the sampling process over iterations.
- The bottom graph illustrates the Metropolis-Hastings algorithm with a green dot indicating the point of acceptance.

The x-axis ranges from -3 to 3, and the y-axis represents the probability density.
\text{dnorm}(x, \text{target}\_\mu, \text{target}\_sd)
```r
dnorm(x, target_mu, target_sd)
```

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target}\_\text{mu}, \text{target}\_\text{sd})

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu, target\_sd})

Trace

Metropolis–Hastings

$-3$  $-2$  $-1$  $0$  $1$  $2$  $3$
\texttt{dnorm(x, target\_mu, target\_sd)}
The plot shows the behavior of a Metropolis-Hastings algorithm over a target distribution. The left side of the graph displays the probability density function (PDF) of the target distribution, denoted as `dnorm(x, target_mu, target_sd)`. The right side of the graph, labeled "Trace", illustrates the evolution of the algorithm's state over iterations, demonstrating how the samples are drawn from the target distribution. The bottom section, labeled "Metropolis-Hastings", further visualizes the acceptance ratio, indicating the efficiency of the sampling process.
The diagram illustrates the use of the Metropolis-Hastings algorithm in Bayesian inference. The top graph shows the target posterior distribution (solid line) and the proposal distribution (dashed line). The middle graph is the trace plot, which tracks the samples drawn from the posterior distribution over iterations. The bottom graph depicts the Metropolis-Hastings acceptance criterion, where the solid line represents the target distribution and the dashed line represents the proposal distribution. The vertical line indicates the acceptance threshold.
$dnorm(x, \text{target}\_\mu, \text{target}\_sd)$

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3

$-3 -2 -1 \varphi 1 2 3$
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis–Hastings

\[ x \]

\[ -3 \quad -2 \quad -1 \quad 0 \quad 1 \quad 2 \quad 3 \]
\text{dnorm}(x, \text{target} \_\mu, \text{target} \_\text{sd})
The image consists of a graph with a normal distribution curve labeled `dnorm(x, target_mu, target_sd)` at the top. Below it, there is a trace plot labeled `Trace` showing the trajectory of a Markov Chain Monte Carlo (MCMC) simulation. At the bottom, there is another plot labeled `Metropolis–Hastings` with two normal distributions, one solid and one dashed, along with a vertical line indicating the target mean `x`. The X-axis ranges from -3 to 3.
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\begin{align*}
\text{Trace} & \\
\text{Metropolis-Hastings} & \\
\end{align*}
Metropolis–Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3  -2  -1  0  1  2  3
\texttt{dnorm(x, target\_mu, target\_sd)}

\textbf{Trace}

\textbf{Metropolis–Hastings}
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis–Hastings

-3 -2 -1 0 1 2 3
The diagram illustrates the use of the Metropolis-Hastings algorithm in a Bayesian context. The top panel shows the density function of a normal distribution, $dnorm(x, target\_mu, target\_sd)$. The middle panel is a trace plot of the Markov chain generated by the algorithm, indicating the path taken by the algorithm as it samples from the posterior distribution. The bottom panel demonstrates the Metropolis-Hastings sampling process, with the solid line representing the proposal distribution and the dashed line the acceptance distribution. The green dot indicates the starting point of the sampling process.
```
dnorm(x, target_mu, target_sd)
```

```
Trace
```

```
Metropolis-Hastings
```

```
\[ \text{dnorm}(x, \text{target}\_\text{mu}, \text{target}\_\text{sd}) \]

-3 -2 -1 0 1 2 3

Trace

Metropolis-Hastings
$dnorm(x, \text{target\_mu}, \text{target\_sd})$
ddnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
The diagram shows a normal distribution function, denoted as \( \text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma) \), with two overlapping curves, one in red and one in blue. Below the distribution, a trace plot illustrates the sampling process over iterations, indicating the evolution of samples towards the target distribution. The Metropolis-Hastings algorithm is represented by the blue dashed line, showing how samples are drawn from the distribution and how they are accepted or rejected based on the target distribution.
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis-Hastings

\[ x \]

\[ -3 \quad -2 \quad -1 \quad 0 \quad 1 \quad 2 \quad 3 \]
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis–Hastings

$-3 \quad -2 \quad -1 \quad 0 \quad 1 \quad 2 \quad 3$
The diagram shows a comparison of two distributions: one solid line and one dashed line, labeled as `dnorm(x, target_mu, target_sd)`.

The x-axis is labeled as `x` with values ranging from -3 to 3. The y-axis is not labeled but appears to represent the density function.

The upper section of the diagram is labeled as `Trace` and shows a series of horizontal lines that represent the trace plot of the Markov Chain Monte Carlo (MCMC) samples.

The lower section of the diagram is labeled as `Metropolis-Hastings` and shows a series of horizontal lines that represent the trace plot of the MCMC samples for the Metropolis-Hastings algorithm.
\text{dnorm}(x, \text{target}_\mu, \text{target}_{sd})

\text{Trace}

\text{Metropolis-Hastings}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\text{dnorm}(x, \text{target}_\mu, \text{target}_sd)
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
$dnorm(x, \text{target}_\mu, \text{target}_\sigma)$

Trace

Metropolis–Hastings
The image contains a graph with the following data: 

- The title on the left side is "dnorm(x, target_mu, target_sd)". 
- The horizontal axis is labeled "Trace" with values from -3 to 3. 
- The vertical axis is labeled "Metropolis-Hastings". 

The graph shows a distribution curve with a peak around the target mu and target sd values. The trace plot below the curve indicates the movement of the sampling process, with a sample point marked at x=2.
Metropolis-Hastings

Trace

dnorm(x, target_mu, target_sd)
\text{dnorm}(x, \text{target}_\mu, \text{target}_sd)$

Trace

Metropolis–Hastings

-3 -2 -1 0 1 2 3

-3 -2 -1 0 1 2 3
The diagram illustrates a Markov Chain Monte Carlo (MCMC) simulation using the Metropolis-Hastings algorithm. The top panel shows the target distribution, which is a normal distribution with parameters target_mu and target_sd. The middle panel is a trace plot, which tracks the values of the simulated parameter over the iterations of the MCMC. The bottom panel shows the Metropolis-Hastings acceptance/rejection criterion, indicating how proposed values are accepted or rejected based on the target distribution.
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
The diagram shows a comparison between the normal distribution (dnorm(x, target_mu, target_sd)) and the Metropolis-Hastings algorithm. The trace plot tracks the samples generated by the algorithm over iterations. The Metropolis-Hastings algorithm is used to draw samples from a probability distribution when direct draws are difficult. The algorithm proposes new samples and accepts them based on a probability that depends on the target distribution.
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis–Hastings
$dnorm(x, \text{target\_mu}, \text{target\_sd})$
\texttt{dnorm(x, target\_mu, target\_sd)}

\[ \begin{array}{cccccccc}
\text{Trace} \\
\text{Metropolis-Hastings}
\end{array} \]

\[ \begin{array}{cccccccc}
-3 & -2 & -1 & 0 & 1 & 2 & 3
\end{array} \]
\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]
```r
dnorm(x, target_mu, target_sd)
```

**Trace**

**Metropolis–Hastings**
$\text{dnorm}(x, \text{target}_\mu, \text{target}_sd)$

Trace

Metropolis-Hastings
The diagram illustrates a graph of the density function of a normal distribution, denoted as $d_{norm}(x, \text{target}_\mu, \text{target}_sd)$, with the x-axis representing the values $\chi$ ranging from $-3$ to $3$. The density function is shown as a continuous red curve. The trace plot, depicting the path of the sampling process, is shown in black, and the Metropolis-Hastings proposal distribution is illustrated with dashed blue lines.
Metropolis–Hastings
$$\text{dnorm}(x, \text{target}\_\mu, \text{target}\_\sigma)$$

Trace

Metropolis–Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
\text{dnorm}(x, \text{target}\_\text{mu}, \text{target}\_\text{sd})

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]

Trace

Metropolis–Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis–Hastings

-3 -2 -1 0 1 2 3
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
The image shows a graph with two main axes: one labeled "dnorm(x, target_mu, target_sd)" and the other labeled "Trace". The "dnorm" axis has a normal distribution curve, while the "Trace" axis displays a trace plot of a Markov Chain Monte Carlo (MCMC) simulation. The graph also features a Metropolis-Hastings algorithm trajectory, indicated by the dashed blue line, which starts from the left and moves towards the right, reflecting the evolution of the simulated samples over iterations. The MCMC chain appears to explore the parameter space efficiently, as indicated by the dense and evenly spread trace.
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]
dnorm(x, target_mu, target_sd)
dnorm(x, target_mu, target_sd)
The plot shows a demonstration of the Metropolis-Hastings algorithm. The distributions represented are:

- **dnorm(x, target_mu, target_sd)**: This represents a normal distribution with a specified mean (target_mu) and standard deviation (target_sd).

The trace plot illustrates the path taken by the algorithm through the parameter space, showing how it samples from the target distribution.

The Metropolis-Hastings algorithm is a Markov Chain Monte Carlo (MCMC) method used to obtain a sequence of samples from a probability distribution. It is particularly useful for sampling from complex distributions where direct sampling is difficult.
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings
$dnorm(x, target\_mu, target\_sd)$

Trace

Metropolis–Hastings
\[
dnorm(x, \text{target}_\mu, \text{target}_\sigma)
\]
$dnorm(x, \text{target}_\mu, \text{target}_sd)$
The diagram illustrates the probability density function (PDF) of a normal distribution, denoted as `dnorm(x, target_mu, target_sd)`. The trace plot represents the movement of a Markov Chain Monte Carlo (MCMC) sampler through the parameter space, showing the evolution of the samples over iterations. The Metropolis-Hastings algorithm is demonstrated by the acceptance or rejection of proposed moves, indicated by the solid and dashed lines in the trace plot. The green dot marks the starting point of the MCMC chain, and the distribution of the final samples is visualized in the lower part of the diagram, illustrating the convergence of the chain to the target distribution.
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3
\texttt{dnorm(x, target\_mu, target\_sd)}
The diagram illustrates the Metropolis-Hastings algorithm. The top portion shows the target distribution, represented by a solid red line. The lower portion demonstrates the actual samples drawn from the distribution, indicated by the black lines. The Metropolis-Hastings sampling path is depicted in blue, showing how the algorithm adjusts its proposals to converge to the target distribution.
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
$dnorm(x, \text{target}_\mu, \text{target}_sd)$

Trace

Metropolis−Hastings
\text{dnorm}(x, \text{target}\_\mu, \text{target}\_sd)

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)

\text{Trace}

\text{Metropolis–Hastings}
$dnorm(x, \text{target\_mu}, \text{target\_sd})$
\texttt{dnorm(x, target\_mu, target\_sd)}
\[ \text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma) \]

Trace

Metropolis-Hastings
The diagram illustrates the behavior of a Metropolis-Hastings algorithm in exploring a target distribution. The top graph shows the target distribution (solid red line) and the proposal distribution (dashed blue line). The bottom two graphs display the trace of the Markov chain over the parameter space, indicating how the algorithm moves from one state to another. The chain appears to converge to the target distribution, as evident from the trace plots. The Metropolis-Hastings algorithm is a Markov chain Monte Carlo (MCMC) method used for sampling from a probability distribution.
Metropolis–Hastings
Dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3
\texttt{dnorm(x, target\_mu, target\_sd)}

\texttt{Trace}

\texttt{Metropolis-Hastings}
$dnorm(x, \text{target}\_\mu, \text{target}\_sd)$

Trace

Metropolis–Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_{sd})
\text{dnorm}(x, \text{target}\_\mu, \text{target}\_\sigma)
The figure shows a density plot of a normal distribution with solid and dashed lines. The trace plot below the density shows the path of the random variable over iterations, indicating the convergence of the Metropolis-Hastings algorithm. The Metropolis-Hastings distribution is displayed at the bottom, illustrating the proposal distribution (dashed line) and the target distribution (solid line). The x-axis represents the values of the random variable, and the y-axis represents the probability density.
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
The image contains a graph with the following components:

- The top section shows a normal distribution curve labeled `dnorm(x, target_mu, target_sd)`.
- The middle section is labeled as `Trace` and depicts a trace plot of a Markov Chain Monte Carlo (MCMC) simulation.
- The bottom section is labeled as `Metropolis-Hastings` and displays the evolution of the MCMC chain over iterations.

The x-axis ranges from -3 to 3, and the y-axis is not explicitly shown but is implied to be related to the distribution and trace plots.
\text{dnorm}(x, \text{target}_\mu, \text{target}_\text{sd})

Trace

Metropolis–Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3
$dnorm(x, \text{target}_\mu, \text{target}_\sigma)$

Trace

Metropolis–Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3  -2  -1  0  1  2  3

x
The image contains a comparison of two probability distributions. The upper graph shows a normal distribution (dnorm) with parameters `target_mu` and `target_sd`. The lower graph displays the Metropolis-Hastings algorithm trace, with solid and dashed lines representing different iterations. The `trace` refers to the sequence of samples generated by the algorithm.
The diagram illustrates the behavior of the Metropolis-Hastings algorithm in a statistical context. The top panel shows a probability distribution function (PDF) denoted as $\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})$. The middle panel displays a trace plot, which tracks the sequence of samples drawn from the distribution. The bottom panel depicts the acceptance probability densities, indicating the probability of accepting or rejecting a proposed move in the sampling process.
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
\text{dnorm}(x, \text{target\_mu, target\_sd})

\text{Trace}

\text{Metropolis–Hastings}
\text{dnorm}(x, \text{target}_\mu, \text{target}_\text{sd})

Trace

Metropolis-Hastings

$\chi$
\text{dnorm}(x, \text{target}_\mu, \text{target}_\text{sd})

\text{Trace}

\text{Metropolis-Hastings}
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
The image contains a graph with various distributions and traces. The top graph shows a normal distribution curve labeled `dnorm(x, target_mu, target_sd)` with solid and dashed lines. The middle graph is labeled as `Trace` and displays a trace plot with numerous horizontal lines indicating sampled values. The bottom graph is labeled `Metropolis-Hastings` and features a bell curve with a dashed line indicating the proposal distribution.
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\begin{itemize}
\item Trace
\item Metropolis–Hastings
\end{itemize}
$$dnorm(x, \text{target\_mu, target\_sd})$$

Trace

Metropolis–Hastings
Metropolis–Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
Metropolis-Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_sd)
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)$
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings

\begin{align*}
\text{Metropolis-Hastings} & \quad -3 \quad -2 \quad -1 \quad 0 \quad 1 \quad 2 \quad 3
\end{align*}
$dnorm(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis–Hastings

-3 -2 -1 0 1 2 3

-3 -2 -1 0 1 2 3
The diagram shows the Metropolis-Hastings algorithm in action. The top graph represents the target distribution, while the bottom graph illustrates the proposal distribution. The trace plot in the middle displays the sampled values, indicating how the algorithm moves through the parameter space.
\text{dnorm}(x, \text{target} \mu, \text{target} \sigma_d)
\texttt{dnorm(x, target\_mu, target\_sd)}
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
$$dnorm(x, \text{target}_{\mu}, \text{target}_{sd})$$

Trace

Metropolis-Hastings
```plaintext
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
```

- **Trace**
- **Metropolis-Hastings**
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings
\textbf{dnorm(x, target_mu, target_sd)}

\textbf{Trace}

\textbf{Metropolis-Hastings}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis–Hastings

-3 -2 -1 0 1 2 3

-3 -2 -1 0 1 2 3
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
\texttt{dnorm(x, target\_mu, target\_sd)}

\textbf{Trace}

\textbf{Metropolis-Hastings}
\texttt{dnorm(x, target\_mu, target\_sd)}

\textbf{Trace}

\textbf{Metropolis-Hastings}
The diagram shows a normal distribution function $d\text{norm}(x, \text{target\_mu}, \text{target\_sd})$ with two sets of traces that represent the Metropolis-Hastings algorithm. The traces are shown against the normal distribution, with some points marked to illustrate the sampling process.
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\begin{figure}
\centering
\begin{tikzpicture}
\begin{axis}[
axis lines=left,
axis line style={thick},
xlabel=$\chi$,
ylabel=,
]
\addplot[very thick,red] coordinates {(-3,-2) (-2,-1) (-1,0) (0,1) (2,0) (3,-2)};
\addplot[dashed,blue] coordinates {(-3,-2) (-2,-1) (-1,0) (0,1) (2,0) (3,-2)};
\end{axis}
\end{tikzpicture}
\end{figure}

\begin{figure}
\centering
\begin{tikzpicture}
\begin{axis}[
axis lines=left,
axis line style={thick},
xlabel=$\chi$,
ylabel=,
]
\addplot[very thick,red] coordinates {(-3,-2) (-2,-1) (-1,0) (0,1) (2,0) (3,-2)};
\addplot[dashed,blue] coordinates {(-3,-2) (-2,-1) (-1,0) (0,1) (2,0) (3,-2)};
\end{axis}
\end{tikzpicture}
\end{figure}

\begin{figure}
\centering
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axis line style={thick},
xlabel=$\chi$,
ylabel=,
]
\addplot[very thick,red] coordinates {(-3,-2) (-2,-1) (-1,0) (0,1) (2,0) (3,-2)};
\addplot[dashed,blue] coordinates {(-3,-2) (-2,-1) (-1,0) (0,1) (2,0) (3,-2)};
\end{axis}
\end{tikzpicture}
\end{figure}

\begin{figure}
\centering
\begin{tikzpicture}
\begin{axis}[
axis lines=left,
axis line style={thick},
xlabel=$\chi$,
ylabel=,
]
\addplot[very thick,red] coordinates {(-3,-2) (-2,-1) (-1,0) (0,1) (2,0) (3,-2)};
\addplot[dashed,blue] coordinates {(-3,-2) (-2,-1) (-1,0) (0,1) (2,0) (3,-2)};
\end{axis}
\end{tikzpicture}
\end{figure}
$$dnorm(x, \text{target}_{\mu}, \text{target}_{sd})$$
`dnorm(x, target_mu, target_sd)`

**Trace**

**Metropolis–Hastings**
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
```
dnorm(x, target_mu, target_sd)
```

Metropolis–Hastings

Trace

```
-3  -2  -1  0   1   2   3
```

Metropolis–Hastings

```
-3  -2  -1  0   1   2   3
```
The graph shows a comparison between the Metropolis-Hastings algorithm and the target distribution. The top panel displays the target distribution (red line) and the proposal distribution (blue dashed line). The middle panel illustrates the trace of the Metropolis-Hastings algorithm, indicating the sampling process. The bottom panel contrasts the Metropolis-Hastings output with the target distribution, highlighting the convergence of the algorithm to the target distribution.
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)

\begin{align*}
  \text{Trace} \\
  \text{Metropolis-Hastings}
\end{align*}
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)

\begin{align*}
\text{Trace} \\
\text{Metropolis–Hastings}
\end{align*}
$$\text{dnorm}(x, \text{target}\_\mu, \text{target}\_sd)$$

**Trace**

**Metropolis–Hastings**
$dnorm(x, \text{target}\_\mu, \text{target}\_sd)$

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
The image shows a plot with the following elements:

- The title `dnorm(x, target_mu, target_sd)` is likely referring to a normal distribution function.
- There are two lines, one red and one blue, representing different distributions or samples.
- The x-axis is labeled with values `-3` to `3`.
- The y-axis is labeled with a title `Trace` and `Metropolis-Hastings`.
- The plot includes a trace plot showing the evolution of the samples over iterations.

The diagram illustrates the behavior of samples generated from a normal distribution, possibly with a Metropolis-Hastings algorithm.
\text{dnorm}(x, \text{target}\_\mu, \text{target}\_sd)
The image shows a statistical distribution and trace plots, likely related to a Metropolis-Hastings algorithm. The top graph represents the density of a normal distribution (`dnorm(x, target_mu, target_sd)`). The middle graph displays a trace plot, which is a series of samples from the distribution. The bottom graph illustrates the Metropolis-Hastings move, with two distributions: the target distribution (solid line) and the proposal distribution (dashed line). The green dot indicates a sample from the target distribution.
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis–Hastings
The diagram illustrates the Metropolis-Hastings algorithm with a target distribution (solid red line) and a proposal distribution (dashed blue line). The trace (bottom middle) shows the sequence of samples drawn from the proposal distribution, which are then accepted or rejected based on the Metropolis-Hastings acceptance probability. The Metropolis-Hastings transition probability is denoted as $dnorm(x, \text{target\_mu}, \text{target\_sd})$. The plot also includes a normal distribution (dashed blue line) for comparison.
$\text{dnorm}(x, \text{target}\_\text{mu}, \text{target}\_\text{sd})$
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)

\text{Trace}

\text{Metropolis-Hastings}
$dnorm(x, target\_mu, target\_sd)$

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_\text{sd})

\text{Trace}

\text{Metropolis-Hastings}
\text{dnorm}(x, \text{target}\_\mu, \text{target}\_sd)$

\begin{align*}
\text{Trace} & \\
\text{Metropolis-Hastings} & \\
\end{align*}

\begin{align*}
-3 & \quad -2 \quad -1 \quad 0 \quad 1 \quad 2 \quad 3
\end{align*}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}\n
\text{Metropolis-Hastings}
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings
$$dnorm(x, \text{target}_\mu, \text{target}_sd)$$

Trace

Metropolis-Hastings
```r
dnorm(x, target_mu, target_sd)
```

**Trace**

**Metropolis-Hastings**
$dnorm(x, \text{target\_mu, target\_sd})$

Trace

Metropolis-Hastings

$\chi$
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
The diagram shows the Metropolis-Hastings algorithm applied to a target distribution. The trace plot demonstrates the movement of the Markov chain through the state space, with the solid line indicating the chain's path and the dashed line marking the target distribution. The Metropolis-Hastings ratio is depicted at the bottom, with the proposal distribution shown for comparison.
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
$dnorm(x, \text{target} \_\mu, \text{target} \_sd)$

Trace

Metropolis–Hastings

-3  -2  -1  0  1  2  3

$\mu$
**dnorm(x, target_mu, target_sd)**
$$dnorm(x, \text{target}_mu, \text{target}_sd)$$

Trace

Metropolis–Hastings
\[ \text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma) \]
The diagram illustrates the behavior of the Metropolis-Hastings algorithm. The top plot shows the target distribution, represented by the solid red curve. The dashed blue curve represents the proposal distribution. The middle plot is the trace of the Markov chain, indicating the path taken by the algorithm in the parameter space. The bottom plot visualizes the acceptance probability, with the solid line being the proposal distribution and the dashed line being the target distribution. The green dot indicates the starting point of the chain.
\begin{align*}
\text{dnorm}(x, \text{target}_\mu, \text{target}_sd) \\
\text{Trace} \\
\text{Metropolis-Hastings}
\end{align*}
The image shows a graph with two distributions. The top graph represents the density function `dnorm(x, target_mu, target_sd)` for two different values of `target_mu` and `target_sd`. The middle section is labeled as `Trace` and visualizes the sampling process over multiple iterations, showing the path of the samples collected during the Metropolis-Hastings algorithm. The bottom graph is labeled `Metropolis-Hastings` and displays the trace of the acceptance rate over time, highlighting the movement and spread of the samples.
dnorm(x, target_mu, target_sd)
\texttt{dnorm(x, target\_mu, target\_sd)}

\textbf{Trace}

\textbf{Metropolis-Hastings}
\textit{dnorm}(x, \texttt{target\_mu}, \texttt{target\_sd})

\textbf{Trace}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\begin{align*}
\text{Trace} \\
\text{Metropolis-Hastings}
\end{align*}

\begin{axis}[ymin=-1, ymax=1, xmin=-3, xmax=3]
\addplot[solid, red] coordinates {(-3,0) (-2,0) (-1,0) (0,0) (1,0) (2,0) (3,0)};
\addplot[ dashed, blue] coordinates {(-3,0) (-2,0) (-1,0) (0,0) (1,0) (2,0) (3,0)};
\addplot[only marks] coordinates {(-3,0) (-2,0) (-1,0) (0,0) (1,0) (2,0) (3,0)};
\end{axis}
\text{dnorm}(x, \text{target}_\text{mu}, \text{target}_\text{sd})

\text{Trace}

\text{Metropolis-Hastings}
\text{dnorm}(x, \text{target}_\text{mu}, \text{target}_\text{sd})

Trace

Metropolis–Hastings

-3 -2 -1 0 1 2 3

-3 0 3
\text{dnorm}(x, \text{target_mu}, \text{target_sd})

\text{Trace}

\text{Metropolis-Hastings}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\texttt{dnorm(x, target\_mu, target\_sd)}
d\text{norm}(x, \text{target\_mu}, \text{target\_sd})
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3  -2  -1  0  1  2  3
$$dnorm(x, \text{target\_mu}, \text{target\_sd})$$

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3
\textnormal{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis–Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3
\[ d\text{norm}(x, \text{target}_\mu, \text{target}_\sigma) \]

Trace

Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis−Hastings

-3 -2 -1 0 1 2 3
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
dnorm(x, target_mu, target_sd)
\text{dnorm}(x, \text{target}_{\mu}, \text{target}_{\sigma})

\begin{align*}
\text{Trace} & \\
\text{Metropolis–Hastings} & \\
\end{align*}
\texttt{dnorm(x, target\_mu, target\_sd)}

\begin{itemize}
\item Trace
\item Metropolis-Hastings
\end{itemize}
The image contains a graph showing a normal distribution with a solid red line representing the density function and a dashed blue line representing the density function with a different mean parameter. The graph also includes a trace plot at the bottom, showing the sampling process for the Metropolis-Hastings algorithm. The trace plot displays a set of samples that appear to densely cover the region of interest, suggesting an effective exploration of the parameter space.
\text{dnorm}(x, \text{target\_mu, target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

−3 −2 −1 0 1 2 3
```r
dnorm(x, target_mu, target_sd)
```

Trace

Metropolis-Hastings
$dnorm(x, \text{target}_\mu, \text{target}_sd)$

Trace

Metropolis–Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3
The graph shows a comparison of distributions. The red solid line represents the normal distribution parameterized by $\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)$, while the blue dashed line represents another distribution. The trace plot below the main graph indicates the evolution of samples over iterations. The bottom graph illustrates the Metropolis-Hastings algorithm's trajectory, with the solid line indicating the target distribution and the dashed line indicating the proposal distribution.
\texttt{dnorm(x, target\_mu, target\_sd)}
\texttt{dnorm(x, target\_mu, target\_sd)}
\text{dnorm}(x, \text{target}_\text{mu}, \text{target}_\text{sd})

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3
\texttt{dnorm(x, target\_mu, target\_sd)}

-3  -2  -1  0  1  2  3

Trace

Metropolis–Hastings

-3  -2  -1  0  1  2  3
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\text{dnorm}(x, \text{target}\_\mu, \text{target}\_sd)
\texttt{dnorm(x, target\_mu, target\_sd)}

\textbf{Trace}

\textbf{Metropolis-Hastings}
\text{dnorm}(x, \text{target\_mu, target\_sd})

\begin{align*}
\text{Trace} & \\
\text{Metropolis-Hastings} & \\
\end{align*}

\begin{align*}
\text{Logit} & \\
\text{Logistic} & \\
\end{align*}
\texttt{dnorm(x, target\_mu, target\_sd)}
The Metropolis-Hastings algorithm is illustrated with a trace plot and an example of the distribution function. The trace plot shows the movement of the algorithm's state over time, with the solid line representing the target distribution and the dotted line the proposal distribution. The Metropolis-Hastings proposal distribution is shown below the trace plot, with the target distribution overlaid.
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

\textbf{Trace}

\textbf{Metropolis-Hastings}
\texttt{dnorm(x, target_mu, target_sd)}

\texttt{Trace}

\texttt{Metropolis-Hastings}
$dnorm(x, \text{target}_\mu, \text{target}_\text{sd})$

Trace

Metropolis-Hastings
Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis–Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis–Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\textnormal{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis-Hastings.
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)

Trace

Metropolis-Hastings
$\text{dnorm(x, target\_mu, target\_sd)}$

Trace

Metropolis–Hastings
The image contains a graph with a normal distribution curve at the top and a trace plot in the middle. The x-axis is labeled with values from -3 to 3. The normal distribution curve is shown with a solid red line, and the trace plot is depicted with a series of black lines. Below the trace plot, there is a Metropolis-Hastings plot indicating the movement of the sampling process.
Metropolis-Hastings

Trace

dnorm(x, target_mu, target_sd)
The image contains a graph with two normal distribution curves, labeled `dnorm(x, target_mu, target_sd)` and `Metropolis-Hastings`. The graph also shows a trace plot for the Metropolis-Hastings algorithm.
The diagram illustrates a normal distribution function, denoted as $\text{dnorm}(x, \text{target}_\mu, \text{target}_sd)$, showing two overlapping curves. Below the distribution, a trace plot is depicted with a sequence of black lines representing the trajectory of a Markov Chain Monte Carlo (MCMC) sampling process. At the bottom, a Metropolis-Hastings acceptance curve is shown, indicating the acceptance of transitions in the MCMC sampling process. The x-axis ranges from -3 to 3, with marked points at -2 and 1.
Chain

Metropolis–Hastings

Trace

dnorm(x, target_mu, target_sd)
\[ \text{dnorm}(x, \text{target} \_\mu, \text{target} \_\sigma) \]

**Trace**

**Metropolis–Hastings**

\begin{align*}
-3 & \quad -2 & \quad -1 & \quad 0 & \quad 1 & \quad 2 & \quad 3 \\
\end{align*}
The image shows a graph with two curves. The upper curve is labeled as $dnorm(x, \text{target}_\mu, \text{target}_\sigma)$, indicating a normal distribution function. The lower curve appears to be a Metropolis-Hastings algorithm trace plot, showing the movement of samples across the parameter space. The horizontal axis represents the parameter $x$, and the vertical axis represents the probability density. The trace plot below the curve shows the sampling process, with the Metropolis-Hastings algorithm attempting to converge to the target distribution.
\textbf{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis–Hastings

-3 -2 -1 0 1 2 3
`dnorm(x, target_mu, target_sd)`

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
\text{dnorm}(x, \text{target}\_\text{mu}, \text{target}\_\text{sd})

\text{Trace}

\text{Metropolis-Hastings}
\[ \text{dnorm}(x, \text{target}_\mu, \text{target}_sd) \]
dnorm(x, target_mu, target_sd)
dnorm(x, target_mu, target_sd)

Trace

Metropolis–Hastings
Metropolis-Hastings
`dnorm(x, target_mu, target_sd)`

Trace

Metropolis-Hastings
\[ \text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma) \]

Trace

Metropolis-Hastings
$$\text{dnorm}(x, \text{target}_\mu, \text{target}_sd)$$

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_sd)

\text{Trace}

\text{Metropolis-Hastings}
trace

dnorm(x, target_mu, target_sd)

Metropolis-Hastings
$\text{dnorm}(x, \text{target}_\text{mu}, \text{target}_\text{sd})$

Trace

Metropolis–Hastings
\texttt{dnorm(x, target_mu, target_sd)}

**Trace**

**Metropolis-Hastings**
The diagram illustrates the tracking of a random variable $x$ over time using the Metropolis-Hastings algorithm. The top panel shows the target distribution $dnorm(x, \text{target\_mu}, \text{target\_sd})$. The middle panel displays the trace of the sampled values over time, indicating the evolution of the random variable. The bottom panel compares the posterior distribution with the prior distribution, highlighting the effect of the Metropolis-Hastings algorithm in updating the distribution of the variable.
\text{dnorm}(x, \text{target}\_\text{mu}, \text{target}\_\text{sd})

Trace

Metropolis–Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}
\text{dnorm}(x, \text{target}\_\text{mu}, \text{target}\_\text{sd})

\text{Trace}

\text{Metropolis-Hastings}
Metropolis-Hastings
\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]
Metropolis–Hastings

dnorm(x, target_mu, target_sd)

Trace

-3 -2 -1 0 1 2 3
The diagram illustrates the Metropolis-Hastings algorithm in the context of a normal distribution. The trace plot shows the evolution of the Markov chain over iterations, indicating how samples are drawn from the target distribution. The Metropolis-Hastings acceptance ratio is depicted below, showcasing the probability density function (pdf) of the target distribution.
dnorm(x, target_mu, target_sd)

Trace

Metropolis–Hastings

-3  -2  -1  0  1  2  3
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
Trace

Metropolis--Hastings

dnorm(x, target_mu, target_sd)
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

x

-3 -2 -1 0 1 2 3
\texttt{dnorm(x, target\_mu, target\_sd)}

\textbf{Trace}

\textbf{Metropolis-Hastings}
$dnorm(x, \text{target\_mu}, \text{target\_sd})$
dnorm(x, target_mu, target_sd)

Metropolis–Hastings

Trace
\text{dnorm}(x, \text{target}_\text{mu}, \text{target}_\text{sd})

\text{Metropolis-Hastings}

\text{Trace}

\text{Metropolis-Hastings}
\text{dnorm}(x, \text{target\_mu, target\_sd})
\text{dnorm}(x, \text{target} \_\mu, \text{target} \_\text{sd})
dnorm(x, target_mu, target_sd)

Metropolis-Hastings

Trace

Metropolis-Hastings
The diagram illustrates a comparison between two distributions. The top panel shows the probability density function (pdf) of a normal distribution with parameters $\mu$ and $\sigma$. The solid red curve represents the target distribution, and the dashed blue line represents the proposal distribution.

The middle panel is a trace plot, which displays the sequence of values generated by the Markov chain Monte Carlo (MCMC) algorithm. The trace plot allows us to visualize the convergence of the chain to the target distribution.

The bottom panel shows the Metropolis-Hastings algorithm, indicating how the proposal distribution is used to generate new samples from the target distribution. The initial sample is shown as a black dot, and the proposal distribution is used to propose new samples, which are then accepted or rejected based on the Metropolis-Hastings ratio.
\[ dnorm(x, \text{target\_mu}, \text{target\_sd}) \]
Metropolis–Hastings

trace

$dnorm(x, target\_mu, target\_sd)$
dnorm(x, target_mu, target_sd)
The diagram illustrates the Metropolis-Hastings algorithm. The top graph shows a comparison of the target distribution (red) and the proposal distribution (blue) using the function `dnorm(x, target_mu, target_sd)`. The middle graph is the trace of the sampling process, showing the evolution of the samples. The bottom graph depicts the Metropolis-Hastings acceptance probability, with the solid line representing the target distribution and the dashed line representing the proposal distribution.
The plot shows the comparison of two distributions: the target distribution (solid red line) and the proposal distribution (dashed blue line). The figure includes a trace plot of sampled values from the proposal distribution (black lines) showing how the samples are generated. The Metropolis-Hastings algorithm is used to move between the two distributions, as indicated by the vertical line and the green dot.
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
dnorm(x, target_mu, target_sd)
dnorm(x, target_mu, target_sd)
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\texttt{dnorm(x, target\_mu, target\_sd)}
```r
dnorm(x, target_mu, target_sd)
```
\texttt{dnorm(x, target_mu, target_sd)}
Metropolis–Hastings

Trace

dnorm(x, target_mu, target_sd)
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3
$$dnorm(x, \text{target}_\mu, \text{target}_\sigma)$$
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
$dnorm(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis–Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

\texttt{Trace}

\texttt{Metropolis-Hastings}
\text{dnorm}(x, \text{target}_\mu, \text{target}_sd)
The diagram illustrates the Metropolis-Hastings algorithm applied to a normal distribution with parameters `target_mu` and `target_sd`. The trace plot shows the sequence of samples drawn from the target distribution, illustrating the movement of the proposal distribution towards the target. The lower graph compares the proposal distribution to the target distribution, with the Metropolis-Hastings proposal acceptance determined by the ratio of the target density at the proposal to the proposal density at the current state.
The Metropolis-Hastings algorithm is a Markov chain Monte Carlo method used to sample from a probability distribution. It is often used in Bayesian statistics to generate samples from posterior distributions. The algorithm works by constructing a Markov chain that has the target distribution as its equilibrium distribution. The chain is constructed by proposing a new state and accepting or rejecting this state based on a probability that depends on the ratio of the target distribution evaluated at the new and old states.
\texttt{dnorm(x, target\_mu, target\_sd)}

\textbf{Trace}

\textbf{Metropolis–Hastings}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
$dnorm(x, \text{target}_\mu, \text{target}_sd)$

Trace

Metropolis–Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3  -2  -1  0  1  2  3
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\begin{align*}
\text{Trace} & \\
\text{Metropolis-Hastings} & \\
\end{align*}


- The diagram illustrates the `dnorm` function with parameters `x`, `target_mu`, and `target_sd`.
- The trace plot shows the sampling process from the Metropolis-Hastings algorithm.
- The Metropolis-Hastings algorithm is used to approximate the target distribution.

**Metropolis-Hastings**

- The diagram compares the proposal distribution (dashed blue line) with the target distribution (solid red line).
- The algorithm starts at a point (indicated by a black dot) and moves between points that are accepted or rejected based on their probabilities.
- The trace plot visually represents the sequence of samples drawn from the target distribution.

---

**Summary**

The diagram provides a visual representation of the Metropolis-Hastings algorithm and its application in approximating the target distribution through a series of accepted and rejected moves.
The diagram illustrates the Metropolis-Hastings algorithm with a target distribution (solid red line) and the proposal distribution (dashed blue line). The trace plot shows the sequence of sampled values, indicating how the algorithm moves between different states in the parameter space. The Metropolis-Hastings acceptance probability is calculated as $\frac{f(x_{new})}{f(x_{old})}$, where $f$ is the target density. The algorithm accepts a new state if this ratio is greater than 1, and it proposes a new state otherwise.
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\begin{itemize}
  \item \text{Trace}
  \item \text{Metropolis-Hastings}
\end{itemize}
$\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis–Hastings

-3
-2
-1
0
1
2
3
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
Metropolis-Hastings
Metropolis–Hastings

dnorm(x, target_mu, target_sd)
\[ \text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma) \]
\texttt{dnorm(x, target\_mu, target\_sd)}

\begin{center}
\begin{tabular}{c}
\textbf{Trace} \\
\includegraphics[width=\textwidth]{trace.png}
\end{tabular}
\end{center}

\begin{center}
\begin{tabular}{c}
\textbf{Metropolis-Hastings} \\
\includegraphics[width=\textwidth]{metropolis-hastings.png}
\end{tabular}
\end{center}
Metropolis–Hastings

Trace

dnorm(x, target_mu, target_sd)
$dnorm(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis-Hastings
\texttt{dnorm(x, target.mu, target.sd)}

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
The graph shows a density function (dnorm) on the top, with a normal distribution curve. Below it, the trace of the sampling process is depicted, indicating the path taken by the Markov chain. At the bottom, the Metropolis-Hastings algorithm is illustrated, showing how the proposal distribution (dashed line) is used to propose new states, which are then accepted or rejected based on the Metropolis-Hastings ratio.
\textbf{dnorm}(x, \text{target}_\mu, \text{target}_\text{sd})
$dnorm(x, \text{target}_\mu, \text{target}_\sigma)$

Trace

Metropolis–Hastings
\textbf{dnorm}(x, \text{target}_\mu, \text{target}_s\text{d})

\textbf{Trace}

\textbf{Metropolis–Hastings}
The diagram illustrates the Metropolis-Hastings algorithm. The top graph shows the target distribution (in red) and the proposal distribution (in blue). The middle graph is the trace of the Markov chain, which is a sequence of samples drawn from the target distribution. The bottom graph depicts the Metropolis-Hastings acceptance criteria, where the red line represents the target distribution and the blue dashed line indicates the proposal distribution. A decision is made at each step based on the ratio of the target to the proposal density at the proposed point.
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis–Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings
The figure shows the normal distribution (dnorm(x, target_mu, target_sd)) with a solid red line. The Metropolis-Hastings algorithm trace is depicted with a black line, and the Metropolis-Hastings distribution is shown with a blue dashed line. The trace plot indicates the sampling process, with each line representing a sample from the distribution.
\text{dnorm}(x, \text{target\_mu, target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
\[ \text{dnorm}(x, \text{target}_\mu, \text{target}_\text{sd}) \]

Trace

Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

\begin{figure}
\centering
\includegraphics[width=\textwidth]{trace.png}
\caption{Trace}
\end{figure}

\begin{figure}
\centering
\includegraphics[width=\textwidth]{metropolis-hastings.png}
\caption{Metropolis-Hastings}
\end{figure}
$dnorm(x, \text{target}_\mu, \text{target}_s)$

Trace

Metropolis–Hastings
$$dnorm(x, \text{target}\_\text{mu}, \text{target}\_\text{sd})$$
\texttt{dnorm(x, target\_mu, target\_sd)}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\begin{align*}
\text{Trace} & \\
\text{Metropolis-Hastings} & \\
\end{align*}
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings

-3
-2
-1
0
1
2
3
`dnorm(x, target_mu, target_sd)`

Trace

Metropolis-Hastings
```
dnorm(x, target_mu, target_sd)
```

Metropolis–Hastings

Trace

-3 -2 -1 0 1 2 3
Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis–Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target}_\text{mu}, \text{target}_\text{sd})
The graph illustrates the Metropolis-Hastings algorithm. The top panel shows the target distribution (solid red line) and the proposal distribution (dashed blue line). The middle panel is the trace plot, which displays the sequence of samples generated by the algorithm. The bottom panel is the Metropolis-Hastings acceptance plot, indicating the acceptance probability of the proposed samples. The density function is denoted as $d\text{norm}(x, \text{target\_mu}, \text{target\_sd})$. The horizontal axis represents the range from $-3$ to $3$.
\text{dnorm}(x, \text{target}_{\mu}, \text{target}_{sd})

\text{Trace}

\text{Metropolis-Hastings}
\texttt{dnorm(x, target_mu, target_sd)}

\textbf{Trace}

\textbf{Metropolis-Hastings}
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)
$dnorm(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis–Hastings

-3 -2 -1 0 1 2 3
dnorm(x, target_mu, target_sd)

Trace

Metropolis–Hastings
Metropolis-Hastings

Trace
dnorm(x, target_mu, target_sd)
$dnorm(x, target\_mu, target\_sd)$

Track

Trace

Metropolis–Hastings

-3  -2  -1  0  1  2  3
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
dnorm(x, target_mu, target_sd)

Metropolis–Hastings

Trace

-3 -2 -1 0 1 2 3
```
dnorm(x, target_mu, target_sd)
```
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis–Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)

\textbf{Trace}

\textbf{Metropolis–Hastings}
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)

\text{Trace}

\text{Metropolis–Hastings}
$dnorm(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis-Hastings
Metropolis-Hastings
The diagram illustrates a normal distribution with parameters `target_mu` and `target_sd`, denoted as `dnorm(x, target_mu, target_sd)`. The trace plot shows the sampling process over iterations, with the Metropolis-Hastings algorithm depicted through the solid and dashed lines. The `x`-axis represents the range from `-3` to `3`, indicating the scale for the distribution.
\text{dnorm}(x, \text{target}\_\mu, \text{target}\_\sigma)
$d\text{norm}(x, \text{target}_\mu, \text{target}_\sigma)$

Trace

Metropolis–Hastings
$dnorm(x, \text{target}_\mu, \text{target}_\sigma)$

Trace

Metropolis-Hastings
$dnorm(x, \text{target}\_\text{mu}, \text{target}\_\text{sd})$

Trace

Metropolis–Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis-Hastings

-3  -2  -1  0  1  2  3
\texttt{dnorm(x, target\_mu, target\_sd)}

\begin{itemize}
\item Trace
\item Metropolis–Hastings
\end{itemize}
$dnorm(x, \text{target\_mu, target\_sd})$

Trace

Metropolis-Hastings
$dnorm(x, \text{target\_mu, target\_sd})$

Trace

Metropolis-Hastings
$$dnorm(x, \text{target}_\mu, \text{target}_sd)$$
\text{dnorm}(x, \text{target\_mu, target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
\[ \text{dnorm}(x, \text{target_mu, target_sd}) \]

Trace

Metropolis–Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)

\text{Trace}

\text{Metropolis-Hastings}
$$dnorm(x, \text{target\_mu}, \text{target\_sd})$$
The graph represents the function $dnorm(x, \text{target\_mu}, \text{target\_sd})$. The top panel shows the probability density function, while the middle panel is a trace plot. The bottom panel illustrates the Metropolis-Hastings algorithm, with the solid line representing the target distribution and the dashed line the proposal distribution.
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis–Hastings
Metropolis–Hastings

dnorm(x, target_mu, target_sd)

Trace
The image shows a plot of a normal distribution function, `dnorm(x, target_mu, target_sd)`, with a solid red line representing the distribution and a dashed blue line representing a Metropolis-Hastings algorithm. The trace of the samples is also shown, indicating the path taken by the algorithm as it moves through the parameter space. The x-axis ranges from -3 to 3, and the y-axis represents the density of the distribution. The Metropolis-Hastings algorithm is used to sample from the target distribution, as indicated by the dashed line.
```
dnorm(x, target_mu, target_sd)
```

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_sd)

-3 -2 -1 0 1 2 3

\text{Trace}

\text{Metropolis-Hastings}
```r
dnorm(x, target_mu, target_sd)
```

Trace plot and Metropolis-Hastings acceptance ratio.
The diagram illustrates a normal distribution (dnorm(x, target_mu, target_sd)) with parameters `target_mu` and `target_sd`. The trace plot shows the sampling process of a Metropolis-Hastings algorithm, with solid lines representing the acceptance and dashed lines representing the proposal distribution.
The image shows a demonstration of the Metropolis-Hastings algorithm. The top part of the image displays a normal distribution (dnorm(x, target_mu, target_sd)) with a solid red line representing the target distribution and a dashed blue line representing the proposal distribution. The middle part of the image is a trace plot showing the samples drawn from the target distribution. The bottom part of the image illustrates the Metropolis-Hastings acceptance criteria, where the green dot indicates the sampled value and the vertical line represents the current position. The x-axis ranges from -3 to 3, with ticks at -3, -2, -1, 0, 1, 2, and 3.
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\begin{tabular}{c}
\text{Trace} \\
\text{Metropolis-Hastings}
\end{tabular}
```
dnorm(x, target_mu, target_sd)
```

Trace plot and Metropolis-Hastings kernel.
dnorm(x, target.mu, target.sd)

Trace

Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}
$dnorm(x, \text{target}\_\mu, \text{target}\_\sigma)$

Trace

Metropolis–Hastings
\[ \text{dnorm}(x, \text{target\_mu, target\_sd}) \]

Trace

Metropolis−Hastings
The diagram illustrates the behavior of the Metropolis-Hastings algorithm in a parameter space. The top graph shows the target distribution (solid red line) and the proposal distribution (dashed blue line). The middle graph is a trace plot, indicating the samples drawn from the target distribution. The bottom graph depicts the Metropolis-Hastings acceptance ratio, with the solid line representing the target distribution and the dashed line the proposal distribution.
Metropolis–Hastings
\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)

\text{Trace}

\text{Metropolis-Hastings}
The graph shows the comparison of different probability distributions. The top graph represents a density function `dnorm(x, target_mu, target_sd)` with a smooth curve indicating the distribution of a normal distribution. The middle graph is labeled as `Trace` and displays a series of horizontal lines that trace the observations or samples taken from the distribution. The bottom graph is labeled as `Metropolis–Hastings` and illustrates the acceptance rate or the comparison of the target distribution with the proposal distribution, visually demonstrating the Metropolis–Hastings algorithm's acceptance decisions.
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

\textbf{Trace}

\textbf{Metropolis-Hastings}
dnorm(x, target_mu, target_sd)

Trace

Metropolis–Hastings

-3 -2 -1 0 1 2 3

-3 -2 -1 0 1 2 3
\[\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)\]
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
$dnorm(x, \text{target}_\mu, \text{target}_{sd})$

Trace

Metropolis–Hastings

-3 -2 -1 0 1 2 3
\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]
$\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)$
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3
\text{dnorm}(x, \text{target} \_\mu, \text{target} \_\sigma_d)
\textbf{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\textbf{Trace}

\textbf{Metropolis-Hastings}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3

\(\hat{\chi}\)
The diagram illustrates the performance of the Metropolis-Hastings algorithm in sampling from a target distribution. The top panel shows the density function of the target distribution, while the bottom panel displays the Metropolis-Hastings trace plot. The trace plot tracks the evolution of the sampling process over iterations, with the solid line representing the target distribution and the dashed line showing the proposed distribution. The green circle indicates the starting point of the sampling process, and the vertical line represents the acceptance criterion for the proposed moves. The acceptance probability is determined by the ratio of the target distribution at the candidate point to the proposal distribution at the candidate point, adjusted by the ratio of the proposal distribution at the current point to the proposal distribution at the candidate point.
track

\[
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
\]

Trace

Metropolis-Hastings

\[
-3 \quad -2 \quad -1 \quad 0 \quad 1 \quad 2 \quad 3
\]
\text{dnorm}(x, \text{target\_mu, target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
```
dnorm(x, target_mu, target_sd)
```

Trace

Metropolis-Hastings
$dnorm(x, \text{target\_mu, target\_sd})$

Trace

Metropolis-Hastings
The figure illustrates a Metropolis-Hastings algorithm for a normal distribution. The trace plot shows the evolution of the Markov chain over iterations, with the Metropolis-Hastings acceptance probability indicated by the green dot.
\text{dnorm}(x, \text{target}_\mu, \text{target}_{sd})
$dnorm(x, \text{target\_mu}, \text{target\_sd})$
\texttt{dnorm(x, target\_mu, target\_sd)}

\textbf{Trace}

\textbf{Metropolis–Hastings}
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
The plot shows the density function $dnorm(x, \text{target}_\mu, \text{target}_\sigma)$, the trace of the samples, and the Metropolis-Hastings distribution.

- The density function is represented by a continuous line with red and blue dashed lines.
- The trace plot shows the sampled values over iterations.
- The Metropolis-Hastings distribution is depicted with solid and dashed lines.
\texttt{dnorm(x, target\_mu, target\_sd)}

\textit{Trace}

\textit{Metropolis–Hastings}
dnorm(x, target_mu, target_sd)

Trace

Metropolis–Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

\texttt{Trace}

\texttt{Metropolis-Hastings}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\begin{align*}
\text{Trace} & \\
\text{Metropolis–Hastings} & \\
\end{align*}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\text{n}\text{orm}(x, \text{target}\_\text{mu}, \text{target}\_\text{sd})

\text{Trace}

\text{Metropolis-Hastings}
$$dnorm(x, \text{target}_\mu, \text{target}_\text{sd})$$
$d\text{norm}(x, \text{target\_mu}, \text{target\_sd})$
dnorm(x, target_mu, target_sd)
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\( \text{dnorm}(x, \text{target\_mu, target\_sd}) \)

Trace

Metropolis–Hastings
```
dnorm(x, target_mu, target_sd)
```
\text{dnorm}(x, \text{target\_mu, target\_sd})

\text{Metropolis-Hastings}

\text{Trace}
\( \text{dnorm}(x, \text{target\_mu, target\_sd}) \)

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

Metropolis–Hastings

\begin{center}
\begin{tikzpicture}
\end{tikzpicture}
\end{center}
\text{dnorm}(x, \text{target} \_\mu, \text{target} \_sd)
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
The diagram illustrates a normal distribution function \( \text{dnorm}(x, \text{target} \_\mu, \text{target} \_\text{sd}) \) along with a trace plot generated using the Metropolis-Hastings algorithm. The trace plot shows the evolution of a random variable over iterations, indicating how the algorithm samples from the target distribution. The Metropolis-Hastings algorithm is a Markov Chain Monte Carlo (MCMC) method used for obtaining a sequence of random samples from a probability distribution for which direct sampling is difficult.
\text{dnorm}(x, \text{target}_{\mu}, \text{target}_{\text{sd}})
dnorm(x, target_mu, target_sd)
$dnorm(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings

\begin{align*}
\text{target\_mu} &= 0 \\
\text{target\_sd} &= 1
\end{align*}
\texttt{dnorm(x, target\_mu, target\_sd)}
dnorm(x, target_mu, target_sd)
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

\begin{itemize}
  \item Trace
  \item Metropolis-Hastings
\end{itemize}
\text{dnorm}(x, \text{target\_mu, target\_sd})
\texttt{dnorm(x, target\_mu, target\_sd)}
The image shows a graphical representation of a probability distribution function, likely related to the normal distribution denoted by `dnorm(x, target_mu, target_sd)`. The graph includes a trace plot and a Metropolis-Hastings algorithm visualization. The trace plot displays the sampling process over a range of values, while the Metropolis-Hastings plot illustrates the movement through the parameter space, with solid and dashed lines indicating different stages of the algorithm.
The image shows a graphical representation of a normal distribution, denoted as `dnorm(x, target_mu, target_sd)`. The trace plot below the distribution illustrates the evolution of samples drawn from this distribution over iterations, marked by the Metropolis-Hastings algorithm. The trace plot suggests convergence to the target distribution by showing a less chaotic pattern as iterations increase. The Metropolis-Hastings algorithm is a Markov Chain Monte Carlo method used to generate a sequence of samples from a probability distribution when direct sampling is difficult.
$d\text{norm}(x, \text{target}_\mu, \text{target}_\sigma)$

Trace

Metropolis–Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)

\begin{align*}
\text{Trace} \\
\text{Metropolis-Hastings}
\end{align*}
```
dnorm(x, target_mu, target_sd)
```

---

**Trace**

---

**Metropolis–Hastings**

---

```R
dnorm(x, target_mu, target_sd)
```
\[ dnorm(x, \text{target}_\mu, \text{target}_sd) \]
The image contains a graph illustrating the behavior of the Metropolis-Hastings algorithm. The graph shows the probability density function (PDF) of a normal distribution, denoted as $d\text{norm}(x, \text{mu}, \text{sd})$. The trace plot displays the evolution of the chain over iterations, indicating how the algorithm samples from the target distribution. The Metropolis-Hastings algorithm iterates through successive states, represented in the bottom right corner of the graph, moving towards the target distribution's peak. The red line represents the target distribution, while the blue lines depict the trajectory of the chain through the state space.
dnorm(x, target_mu, target_sd)
$dnorm(x, \text{target\_mu}, \text{target\_sd})$
$d\text{norm}(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
The image shows a graphical representation of a statistical distribution and its trace. The graph at the top indicates a normal distribution with a density function `dnorm(x, target_mu, target_sd)`. The trace below the density function shows the path of a Metropolis-Hastings algorithm, illustrating how samples are drawn from the target distribution. The Metropolis-Hastings distribution is depicted below the trace, highlighting the process of proposal and acceptance steps in the sampling algorithm.
\textbf{dnorm}(x, \text{target}_\mu, \text{target}_\text{sd})
dnorm(x, target_mu, target_sd)

Trace

Metropolis–Hastings
The diagram illustrates the behavior of the Metropolis-Hastings algorithm in sampling from a target distribution. The top panel shows the target distribution, while the bottom panel displays the trace of the Markov chain. The Metropolis-Hastings algorithm is used to generate samples from the target distribution, which are represented by the red and blue dashed curves in the bottom panel. The algorithm improves by refining the proposal distribution, as indicated by the two curves. The trace shows the movement of the chain through the parameter space, with the Metropolis-Hastings algorithm ensuring that the samples are drawn from the target distribution.
$$d\text{norm}(x, \text{target\_mu}, \text{target\_sd})$$

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\texttt{dnorm(x, target\_mu, target\_sd)}
The diagram shows the Metropolis-Hastings algorithm for a normal distribution with mean \( \mu \) and standard deviation \( \sigma \). The solid red line represents the target distribution, and the blue dashed line represents the proposal distribution. The trace plot below the density plot illustrates the path of samples generated by the algorithm. The Metropolis-Hastings acceptance ratio is indicated by the green dot.
\text{dnorm}(x, \text{target_mu, target_sd}) \qquad \text{Trace} \qquad \text{Metropolis-Hastings}
$dnorm(x, \text{target}_\mu, \text{target}_{sd})$

Trace

Metropolis–Hastings

-3  -2  -1  0  1  2  3
\[ \text{dnorm}(x, \text{target}_\mu, \text{target}_sd) \]

Trace

Metropolis–Hastings
\texttt{dnorm(x, target_mu, target_sd)}
The diagram displays two normal distributions: the solid red line represents the actual target distribution, and the dashed blue line shows the distribution generated by the Metropolis-Hastings algorithm. The trace plot below the distributions provides a visual representation of the samples drawn from the target distribution, with a particular focus on the Metropolis-Hastings chain, highlighted by the black lines.

The Metropolis-Hastings algorithm is a Markov Chain Monte Carlo (MCMC) method used to generate a sequence of samples from a probability distribution, which is otherwise difficult to sample from directly. In this context, the algorithm is applied to a target distribution $dnorm(x, target\_mu, target\_sd)$, where $dnorm$ is the normal density function with mean $target\_mu$ and standard deviation $target\_sd$. The algorithm iteratively proposes new samples and accepts or rejects them based on the Metropolis-Hastings acceptance ratio, aiming to converge to the target distribution over time.
\texttt{dnorm(x, target\_mu, target\_sd)}
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3   -2   -1   0   1   2   3
$\text{dnorm}(x, \text{target}_\mu, \text{target}_sd)$

Trace

Metropolis–Hastings
\text{d\text{norm}(x, \text{target\_mu, target\_sd})}

\text{Trace}

\text{Metropolis-Hastings}
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

x

-3  -2  -1  0  1  2  3
The diagram illustrates the Metropolis-Hastings algorithm applied to a normal distribution. The upper graph shows the probability density function (PDF) of the target distribution, which is a normal distribution with parameters $\text{target}_\mu$ and $\text{target}_\sigma$. The lower graph represents the trace of the Markov chain, demonstrating how the algorithm moves between different samples of the target distribution. The chain appears to converge to the target distribution, indicating the effectiveness of the Metropolis-Hastings algorithm in sampling from the desired distribution.
The image shows a plot with the following elements:

- The top graph represents the density function `dnorm(x, target_mu, target_sd)`.
- The middle graph is a trace plot showing the path taken by the Metropolis-Hastings algorithm.
- The bottom graph illustrates the Metropolis-Hastings function over the range of values from -3 to 3.

The trace plot indicates the sampling process, while the density function and the Metropolis-Hastings function provide a visual representation of the distribution and the sampling mechanism, respectively.
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis–Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\texttt{dnorm(x, target\_mu, target\_sd)}

\texttt{Trace}

\texttt{Metropolis-Hastings}
$dnorm(x, \text{target}_\mu, \text{target}_sd)$

Trace

Metropolis–Hastings

-3 -2 -1 0 1 2 3

Metropolis–Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

**Trace**

**Metropolis-Hastings**
\texttt{dnorm(x, target\_mu, target\_sd)}

\textbf{Trace}

\textbf{Metropolis-Hastings}
dnorm(x, target_mu, target_sd)
\text{dnorm}(x, \text{target}_\mu, \text{target}_{sd})

\text{Trace}

\text{Metropolis-Hastings}
The diagram illustrates a normal distribution function with mean \( \mu \) and standard deviation \( \sigma \) (solid red line). The dashed blue line represents the Metropolis-Hastings algorithm trajectory, indicating the samples generated from the target distribution. The trace plot shows the sequence of samples generated by the algorithm, allowing for visual assessment of convergence and mixing properties.
$d\text{norm}(x, \text{target}\_\mu, \text{target}\_sd)$

Metropolis–Hastings

Trace

$d\text{norm}(x, \text{target}\_\mu, \text{target}\_sd)$
dnorm(x, target_mu, target_sd)
MCMC

-3 -2 -1 0 1 2 3

Metropolis-Hastings

trace

$dnorm(x, \text{target\_mu, target\_sd})$
The image contains a graph with the title "Metropolis-Hastings" and a trace plot. The graph shows a normal distribution curve labeled `dnorm(x, target_mu, target_sd)` and a Metropolis-Hastings chain with a trace plot indicating the sampling process. The x-axis ranges from -3 to 3, and the y-axis represents the probability density function (PDF) of the normal distribution.
Metropolis-Hastings

Trace

dnorm(x, target_mu, target_sd)
$$dnorm(x, \text{target\_mu}, \text{target\_sd})$$

Trace

Metropolis–Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
The diagram illustrates the concepts of Metropolis-Hastings (dashed blue line) and a normal distribution (solid red line). The trace plot shows the evolution of the samples generated by the Metropolis-Hastings algorithm, with the solid red line representing the target distribution.
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings

\begin{align*}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\end{align*}
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings
`dnorm(x, target_mu, target_sd)`
The graph shows the distribution of a normal distribution function, with the solid line representing the target distribution and the dashed line representing the proposal distribution. The trace plot below the distribution shows the samples drawn from the Metropolis-Hastings algorithm, with the line indicating the movement of the proposal distribution towards the target distribution. The Metropolis-Hastings acceptance ratio is indicated by the green dot, showing the successful move to the target distribution.
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis–Hastings
The image shows a plot with the title 'Rnorm(x, target_mu, target_sd)' on the y-axis and the x-axis ranging from -3 to 3. The plot includes two curves representing the distribution with and without Metropolis-Hastings mixing. The trace of the sampling process is also depicted, showing the evolution of the samples over iterations.
\texttt{dnorm(x, target\_mu, target\_sd)}

\textit{Trace}

\textit{Metropolis-Hastings}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\begin{align*}
\text{Trace} \\
\text{Metropolis–Hastings}
\end{align*}

\begin{align*}
-3 & \quad -2 & \quad -1 & \quad 0 & \quad 1 & \quad 2 & \quad 3
\end{align*}
The diagram illustrates the Metropolis-Hastings algorithm for a normal distribution. The top graph shows the probability density function (PDF) of a normal distribution with mean \( \mu \) and standard deviation \( \sigma \), represented as \( \text{dnorm}(x, \mu, \sigma) \). The middle section displays the trace plot, indicating the path taken by the algorithm. The bottom graph represents the Metropolis-Hastings proposal distribution, showing how the algorithm proposes new samples from the target distribution.
dnorm(x, target_mu, target_sd)

Metropolis−Hastings

Trace

Metropolis−Hastings
The image shows a graphical representation of a normal distribution function, $dnorm(x, \text{target}\_\mu, \text{target}\_sd)$, with two overlaid curves. The upper curve is solid red, while the lower one is dashed blue. The x-axis is labeled with values ranging from -3 to 3, and the y-axis represents the density of the distribution.

Below the curves, there is a trace plot labeled "Trace," which appears to show the trajectory of a Markov Chain Monte Carlo (MCMC) simulation. The trace plot is dense with lines indicating the sampling process.

At the bottom, there is a plot labeled "Metropolis-Hastings." This plot also shows a normal distribution curve, with the mean (\mu) marked at the center (\chi). The curve is solid black, and the dashed blue line suggests the acceptance of proposals in the sampling process.

The overall layout suggests the demonstration of a normal distribution and its implementation in an MCMC simulation, possibly for Bayesian inference or statistical modeling.
\text{dnorm(x, target\_mu, target\_sd)}
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\[ \text{dnorm}(x, \text{target}_\mu, \text{target}_\text{sd}) \]

Trace

Metropolis–Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis–Hastings
\[ \dnorm(x, \text{target}_\mu, \text{target}_\sigma) \]
$$dnorm(x, \text{target\_mu}, \text{target\_sd})$$

Trace

Metropolis-Hastings

-3  -2  -1  0  1  2  3
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis-Hastings

\begin{align*}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) & \\
\text{Trace} & \\
\text{Metropolis-Hastings} & \\
-3 & -2 & -1 & 0 & 1 & 2 & 3
\end{align*}
\texttt{dnorm(x, target\_mu, target\_sd)}

\texttt{Trace}

\texttt{Metropolis-Hastings}
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target}_\text{mu}, \text{target}_\text{sd})

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3

-3 -2 -1 0 1 2 3
\texttt{dnorm(x, target\_mu, target\_sd)}

\textbf{Trace}

\textbf{Metropolis-Hastings}
\text{dnorm}(x, \text{target}_\mu, \text{target}_\text{sd})
\texttt{dnorm(x, target\_mu, target\_sd)}

**Trace**

**Metropolis-Hastings**
$\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)$

Trace

Metropolis–Hastings
-3  -2  -1  0   1   2   3

Metropolis-Hastings

dnorm(x, target_mu, target_sd)

Trace

-3  -2  -1  0   1   2   3

Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings

\begin{align*}
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
\end{align*}
plot of a Gaussian distribution with mean target_mu and standard deviation target_sd.

Trace plot showing the samples from the Metropolis-Hastings algorithm.

Comparison of the target distribution (solid line) and the proposal distribution (dashed line) in the Metropolis-Hastings algorithm.
$$dnorm(x, \text{target\_mu, target\_sd})$$
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3
The image shows a graphical representation of a normal distribution (dnorm(x, target_mu, target_sd)) along with a trace plot and Metropolis-Hastings simulation. The trace plot displays the sampling process over different values of the parameter x, indicating how the sampler moves across the parameter space. The Metropolis-Hastings simulation demonstrates the movement of the sampler from one state to another, illustrating the exploration of the parameter space.
The image shows a graph with the following features:

- The title at the top is "dnorm(x, target_mu, target_sd)."
- The x-axis range is from -3 to 3.
- The y-axis represents the density function of a normal distribution.
- The graph includes a solid red curve and a dashed blue curve, indicating two different distributions or samples.
- The bottom left section is labeled "Trace," showing a trace plot of samples from a Metropolis-Hastings algorithm.

The graph visually demonstrates the application of the Metropolis-Hastings algorithm in sampling from a normal distribution with specified parameters.
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
dnorm(x, target_mu, target_sd)
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
`dnorm(x, target_mu, target_sd)`

Trace

Metropolis-Hastings
The diagram illustrates the Metropolis-Hastings algorithm. The top graph shows the probability density function (PDF) of the target distribution, while the bottom graph displays the trace of the algorithm's samples over iterations. The algorithm's acceptance ratio is indicated by the ratio of the current to the target density at each step.
dnorm(x, target_mu, target_sd)

Track

Trace

Metropolis–Hastings
The image contains a diagram that illustrates the use of the `dnorm` function, which is used to evaluate the probability density function of a normal distribution. The diagram includes a graph of the `dnorm` function with a dashed line representing the target distribution and a solid line representing the Metropolis-Hastings algorithm. The `trace` section shows a series of points sampled from the distribution, indicating the exploration of the parameter space during the Metropolis-Hastings algorithm. The `Metropolis-Hastings` section below the trace shows the cumulative distribution of the sampled points.
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis–Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
dnorm(x, target_mu, target_sd)

Trace

Metropolis–Hastings
```r
dnorm(x, target_mu, target_sd)
```
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
$dnorm(x, target\_mu, target\_sd)$

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis–Hastings
Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\text{dnorm}(x, \text{target}_{\mu}, \text{target}_{sd})

\begin{align*}
\text{Trace} \\
\text{Metropolis-Hastings}
\end{align*}
The diagram illustrates the application of the Metropolis-Hastings algorithm. The top graph shows the normal distribution function, while the bottom graph displays the Metropolis-Hastings trace and the target distribution. The trace plot visually represents the sampling process over iterations, highlighting the convergence towards the target distribution.
\text{dnorm}(x, \text{target}_\text{mu}, \text{target}_\text{sd})

\text{Trace}

\text{Metropolis-Hastings}
\textbf{Metropolis–Hastings}

\textbf{Trace}

\textbf{dnorm(x, target_mu, target_sd)}
\texttt{dnorm(x, target\_mu, target\_sd)}
$dnorm(x, \text{target}_\mu, \text{target}_{sd})$

Trace

Metropolis–Hastings
$dnorm(x, \text{target\_mu}, \text{target\_sd})$
dnorm(x, target_mu, target_sd)
\text{dnorm}(x, \text{target}_\mu, \text{target}_\text{sd})

Trace

Metropolis–Hastings
\text{dnorm}(x, \text{target}\_\mu, \text{target}\_\sigma)
Metropolis-Hastings

dnorm(x, target_mu, target_sd)
\text{dnorm}(x, \text{target}_\text{mu}, \text{target}_\text{sd})

\text{Trace}

\text{Metropolis-Hastings}
$$dnorm(x, \text{target}_\mu, \text{target}_\sigma)$$

Trace

Metropolis–Hastings
The diagram illustrates a distribution, likely a normal distribution given the 'dnorm' function notation, with parameters target_mu and target_sd. The red line represents the distribution function, while the blue dashed line indicates samples from the Metropolis-Hastings algorithm. The 'Trace' section shows the evolution of the samples over iterations, with the Metropolis-Hastings algorithm converging towards the target distribution.
\text{dnorm}(x, \text{target}_\mu, \text{target}_\text{sd})

\text{Trace}

\text{Metropolis-Hastings}
\texttt{dnorm(x, target\_mu, target\_sd)}

\texttt{Metropolis-Hastings}
\[ \text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma) \]
trace

Metropolis-Hastings
\textbf{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\textbf{Trace}

\textbf{Metropolis-Hastings}

\[ x \]

\[ -3 \quad -2 \quad -1 \quad 0 \quad 1 \quad 2 \quad 3 \]
dnorm(x, target_mu, target_sd)

Metaropolis–Hastings

Trace

Metropolis–Hastings

-3  -2  -1  0  1  2  3
\text{dnorm}(x, \text{target\_mu, target\_sd})

Trace

\text{Metropolis-Hastings}
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
$dnorm(x, target\_mu, target\_sd)$

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3
\texttt{dnorm(x, target\_mu, target\_sd)}
$dnorm(x, \text{target}\_\mu, \text{target}\_\sigma)$

Trace

Metropolis–Hastings
\text{dnorm}(x, \text{target} \mu, \text{target} \sigma_d)

\textbf{Trace}

\textbf{Metropolis–Hastings}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\text{dnorm}(x, \text{target}\_\mu, \text{target}\_\sigma)

\begin{align*}
\text{Trace} \\
\text{Metropolis-Hastings}
\end{align*}
Dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
Metropolis–Hastings

dnorm(x, target_mu, target.sd)

Trace
The diagram illustrates the Metropolis-Hastings algorithm. The graph shows the target distribution (solid red line) and the proposal distribution (dashed blue line). The trace plot above the graph represents the sequence of candidate samples generated by the algorithm. The Metropolis-Hastings acceptance decision is indicated by a green circle, which is accepted if it falls within the target distribution.
dnorm(x, target_mu, target_sd)

Trace

Metropolis–Hastings
The graph shows a probability density function (PDF) of a normal distribution with mean $\mu$ and standard deviation $\sigma$. The vertical line indicates the value of $\mu$. The trace plot below the density function shows the sampled values from a Metropolis-Hastings algorithm, which are used to approximate the posterior distribution. The Metropolis-Hastings algorithm iteratively samples from the target distribution by proposing new values and accepting or rejecting them based on the ratio of the target distribution at the current and proposed values.
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\begin{figure}
\centering
\begin{tikzpicture}
\begin{axis}[
width=\textwidth, height=\textwidth, 
axis lines=left, 
axis line style={-},

\addplot [very thick, red, smooth] coordinates {
(0,0) (1,0) (2,0) (3,0) (4,0)
};
\addplot [very thick, blue, dashed, smooth] coordinates {
(-3,0) (-2,0) (-1,0) (0,0) (1,0) (2,0) (3,0)
};
\end{axis}
\end{tikzpicture}
\end{figure}

\text{Trace}

\begin{figure}
\centering
\begin{tikzpicture}
\begin{axis}[
width=\textwidth, height=\textwidth, 
axis lines=left, 
axis line style={-},

\addplot [very thick, red, smooth] coordinates {
(0,0) (1,0) (2,0) (3,0) (4,0)
};
\addplot [very thick, blue, dashed, smooth] coordinates {
(-3,0) (-2,0) (-1,0) (0,0) (1,0) (2,0) (3,0)
};
\end{axis}
\end{tikzpicture}
\end{figure}

\text{Metropolis-Hastings}

\begin{figure}
\centering
\begin{tikzpicture}
\begin{axis}[
width=\textwidth, height=\textwidth, 
axis lines=left, 
axis line style={-},

\addplot [very thick, red, smooth] coordinates {
(0,0) (1,0) (2,0) (3,0) (4,0)
};
\addplot [very thick, blue, dashed, smooth] coordinates {
(-3,0) (-2,0) (-1,0) (0,0) (1,0) (2,0) (3,0)
};
\end{axis}
\end{tikzpicture}
\end{figure}
The image contains a graph depicting a normal distribution function, `dnorm(x, target_mu, target_sd)`, with a dashed line and a solid line. Below the graph, there is a trace plot showing the generated samples. The x-axis is labeled with values from -3 to 3. There is also a Metropolis-Hastings plot with dashed lines and a green dot at x=1.
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
$dnorm(x, \text{target}_\mu, \text{target}_\sigma)$

Trace

Metropolis-Hastings
$d\text{norm}(x, \text{target\_mu, target\_sd})$
\[ \text{dnorm}(x, \text{target} \_\mu, \text{target} \_\sigma) \]
The diagram illustrates a trace plot of a Metropolis-Hastings algorithm. The top graph shows the target distribution (red solid line) and the proposal distribution (blue dashed line). The trace plot in the middle visualizes the samples drawn from the target distribution. The Metropolis-Hastings acceptance ratio is shown at the bottom, indicating the decision-making process of the algorithm.
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3
\[ d \text{norm}(x, \text{target}_\mu, \text{target}_\sigma) \]
\texttt{dnorm(x, target\_mu, target\_sd)}
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
Metropolis–Hastings

Trace

dnorm(x, target_mu, target_sd)
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3

-3 -2 -1 0 1 2 3
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3

-3 -2 -1 0 1 2 3
\texttt{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis–Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

\textbf{Trace}

\textbf{Metropolis–Hastings}
The Metropolis-Hastings algorithm is used to generate samples from a target distribution. The trace plot shows the sequence of samples drawn from the distribution. The Metropolis-Hastings ratio is shown below, indicating the probability of accepting a new sample.
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
The diagram illustrates a probability distribution function, specifically the normal distribution \( \text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma) \). The trace plot shows the evolution of a Markov chain Monte Carlo (MCMC) simulation, with the Metropolis-Hastings algorithm generating samples from the posterior distribution. The chain appears to have converged to the target distribution, as indicated by the smooth trace and the green dot marking the target value.
The image contains a graph with a normal distribution curve labeled `dnorm(x, target_mu, target_sd)`. Below it, there is a trace plot labeled `Trace`, showing the path of the sampling process. At the bottom, there is a Metropolis-Hastings plot labeled `Metropolis-Hastings`, illustrating the movement of the sampling process with solid and dashed lines.
\textit{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

[Graph of a normal distribution with a dashed line representing the Metropolis-Hastings algorithm and a solid line representing the target distribution.]

\( x \) values range from -3 to 3.
The image shows a graphical representation of a normal distribution (dnorm) with parameters `x, target_mu, target_sd`. Below the distribution, there is a trace plot (`Trace`) and a Metropolis-Hastings plot (`Metropolis-Hastings`). The x-axis ranges from -3 to 3.
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis–Hastings

\begin{align*}
\text{Trace} & \\
\text{Metropolis–Hastings} & 
\end{align*}
$dnorm(x, \text{target}_\mu, \text{target}_sd)$

Trace

Metropolis-Hastings
The image shows a graph with the title "dnorm(x, target_mu, target_sd)" and a legend indicating "Metropolis-Hastings". The graph includes a trace plot and a normal distribution curve. The x-axis ranges from -3 to 3, with markers at -2, -1, 0, 1, and 2.
Equation: $\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)$

Trace plot:

-3 -2 -1 0 1 2 3

Metropolis-Hastings: $\text{Metropolis-Hastings}$
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\texttt{dnorm(x, target\_mu, target\_sd)}

\begin{itemize}
  \item Trace
  \item Metropolis-Hastings
\end{itemize}
$dnorm(x, \text{target\_mu, target\_sd})$

Trace

Metropolis–Hastings
```
dnorm(x, target_mu, target_sd)
```
```r
dnorm(x, target_mu, target_sd)
```
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
$dnorm(x, target\_mu, target\_sd)$

Trace

Metropolis–Hastings
```
dnorm(x, target_mu, target_sd)
```
dnorm(x, target_mu, target_sd)

Trace

Metropolis–Hastings

-3 -2 -1 0 1 2 3
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis-Hastings
```markdown
\text{dnorm(x, target\_mu, target\_sd)}
```

**Trace**

**Metropolis–Hastings**
\texttt{dnorm(x, target_mu, target_sd)}

**Trace**

**Metropolis-Hastings**
Metropolis−Hastings

dnorm(x, target_mu, target_sd)

Trace

-3 -2 -1 0 1 2 3

Metropolis−Hastings

-3 -2 -1 0 1 2 3
The diagram illustrates a normal distribution function $dnorm(x, \text{target\_mu}, \text{target\_sd})$ with two overlaid curves. The top curve represents the $dnorm(x)$ function, while the bottom curve indicates the Metropolis-Hastings trace. The $Trace$ section shows a series of horizontal lines representing the trace of the Metropolis-Hastings algorithm. The $Metropolis\text{-\_Hastings}$ section at the bottom depicts the movement of the algorithm through the parameter space, with the blue dashed lines representing the proposal distribution and the black lines showing the accepted moves. The $x$ axis is marked with values from $-3$ to $3$. The green dot on the right side indicates the target distribution's peak.
\textbf{T}race

\textbf{Metropolis–Hastings}
\text{dnorm}(x, \text{target}\_\text{mu}, \text{target}\_\text{sd})

\text{Trace}

\text{Metropolis-Hastings}
The image shows a graph with a normal distribution curve (solid red line) and another curve (dashed blue line) overlapping it. Below the curves, there is a trace plot with a vertical line indicating a point of interest. The x-axis ranges from -3 to 3, with markers at -2, -1, 0, 1, 2, and 3. The graph is labeled with the functions `dnorm(x, target_mu, target_sd)` and Metropolis-Hastings.
```
dnorm(x, target_mu, target_sd)
```

**Trace**

**Metropolis-Hastings**

![Diagram with Metropolis-Hastings and traces](image-url)
\text{dnorm}(x, \text{target}_\text{mu}, \text{target}_\text{sd})

\text{Trace}

\text{Metropolis-Hastings}
\text{dnorm}(x, \text{target}\_\mu, \text{target}\_\sigma)
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
$dnorm(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis-Hastings
The image contains a graph showing a normal distribution (dnorm) with a target mean and standard deviation. The trace plot below the normal distribution shows the sampling process, indicating how the Metropolis-Hastings algorithm moves through the parameter space. The Metropolis-Hastings trace plot is visualized with steps indicating the movement from one point to another, reflecting the random walk nature of the algorithm.
\text{dnorm}(x, \text{target}_\mu, \text{target}_\text{sd})
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

\textbf{Trace}

\textbf{Metropolis-Hastings}
The image shows a graph with two overlapping normal distributions represented by solid and dashed lines. The solid line indicates the normal distribution function with parameters \( \mu = 0 \) and \( \sigma = 1 \) (\( \text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma) \)). The dashed line represents the Metropolis-Hastings algorithm, which appears to explore the parameter space around the target distribution, as indicated by the scatter plot in the middle of the graph. The scatter plot shows the trajectory of the sampling process. The x-axis is labeled with values from -3 to 3, and the y-axis is not explicitly labeled but is presumably related to the density function. The bottom part of the graph highlights the Metropolis-Hastings algorithm's path, showing how samples are drawn from the target distribution.
Metropolis-Hastings

Trace

dnorm(x, target_mu, target_sd)
dnorm(x, target_mu, target_sd)
\texttt{dnorm(x, target\_mu, target\_sd)}

**Trace**

**Metropolis–Hastings**
$d\text{norm}(x, \text{target}\_\mu, \text{target}\_sd)$

Trace

Metropolis–Hastings
The diagram illustrates the Metropolis-Hastings algorithm in the context of a normal distribution. The top panel shows the target density function (solid line) and the proposal density function (dashed line). The middle panel is a trace plot, which is a time series of the sampled values. The bottom panel compares the target and proposal distributions.
The diagram illustrates the Metropolis-Hastings algorithm. The top panel shows the target normal distribution (solid red line) and the proposal normal distribution (dashed blue line). The middle panel is a trace plot of the sampled values. The bottom panel depicts the Metropolis-Hastings acceptance function.
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis–Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3
The graph shows the distribution of a random variable under different conditions, as indicated by the `dnorm` function with the parameters `x`, `target_mu`, and `target_sd`. The `Trace` section illustrates the sampling process over time, with `Metropolis-Hastings` indicating the method used for generating samples from the posterior distribution. The `x` axis represents the variable of interest, while the scale ranges from -3 to 3, with key values at 0, 1, and 2 highlighted on the `Metropolis-Hastings` section.
\text{dnorm}(x, \text{target} \_\text{mu}, \text{target} \_\text{sd})
$dnorm(x, \text{target\_mu}, \text{target\_sd})$

**Trace**

**Metropolis–Hastings**
\textbf{Metropolis–Hastings}

-3 -2 -1 0 1 2 3
The image shows a graphical representation of a statistical analysis, likely related to the normal distribution function `dnorm(x, target_mu, target_sd)`. The graph includes a trace plot, which is a common visualization in Bayesian statistics to show the evolution of the parameter values during the Markov Chain Monte Carlo (MCMC) simulation. The trace plot is a sequence of points that represent the values of the parameter of interest at each iteration of the MCMC algorithm. The Metropolis-Hastings algorithm is a popular method for generating samples from a probability distribution when direct sampling is difficult. It is used to draw samples from the posterior distribution in Bayesian inference, where the target distribution is often a complex mixture of a normal distribution and other distributions, as indicated by the overlaid normal distribution curve.
Metropolis-Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3
$\text{dnorm}(x, \text{target\_mu, target\_sd})$
The diagram illustrates the Metropolis-Hastings algorithm in the context of a target distribution. The upper panel shows the target distribution (solid line) and the proposal distribution (dashed line) plotted against the variable $x$. The middle panel is a trace plot, which shows a series of samples drawn from the target distribution, illustrating the path taken by the Markov chain. The lower panel displays the Metropolis-Hastings acceptance criteria, where the red line represents the target distribution and the blue dashed line represents the proposal distribution. The green dot indicates a point where a proposal was accepted. The $x$-axis represents the value of $x$, ranging from $-3$ to $3$. The $y$-axis represents the density of the distribution.
The image shows a distribution function represented by the curve labeled `dnorm(x, target_mu, target_sd)`. The curve is a normal distribution with a mean (`mu`) and standard deviation (`sd`). The graph also includes a trace plot labeled `Trace`, which visualizes the sampling process of a Markov Chain Monte Carlo (MCMC) method, specifically Metropolis-Hastings, represented by the Metropolis-Hastings function. The trace plot shows the evolution of the sampled values over iterations, indicating how the sampling process converges to the target distribution.
```
dnorm(x, target_mu, target_sd)
```

Trace

Metropolis-Hastings
```

Metropolis-Hastings

dnorm(x, target_mu, target_sd)

Trace

-3 -2 -1 0 1 2 3
```

Metropolis−Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

**Trace**

**Metropolis-Hastings**
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3  -2  -1  0  1  2  3
```r
dnorm(x, target_mu, target_sd)
```
\texttt{dnorm(x, target\_mu, target\_sd)}
$\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
Trace

Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

Metropolis–Hastings
The image shows a plot of the normal distribution function, $\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)$, with two trajectories overlaying it. The trajectories represent the Metropolis-Hastings algorithm, with the solid line indicating the path taken by the algorithm and the dashed line representing the target distribution.

The X-axis is labeled with values ranging from -3 to 3, and the Y-axis is labeled with the normal distribution function. The trace of the algorithm is shown in the middle, illustrating the movement of the sampling process over iterations.
$dnorm(x, \text{target\_mu}, \text{target\_sd})$
The diagram illustrates the function `dnorm(x, target_mu, target_sd)` with `target_mu` and `target_sd` parameters. The `Trace` section shows a random walk Markov chain Monte Carlo (MCMC) simulation, while the `Metropolis-Hastings` section demonstrates the acceptance-rejection sampling process.
The diagram shows the distribution of a variable with a normal distribution function (red solid line) and another distribution function (blue dashed line). Below the distribution functions, there is a trace plot (Trace) that depicts the samples generated by the Metropolis-Hastings algorithm. The trace plot illustrates the evolution of the variable over iterations, with a concentration of points in the region of the mode of the target distribution. The bottom part of the diagram illustrates the Metropolis-Hastings algorithm, showing the acceptance ratio and the proposal distribution.
The image shows a graphical representation of a probability distribution, likely a normal distribution, with the density function `dnorm(x, target_mu, target_sd)` depicted. The graph includes a trace plot, which illustrates the sampling process over multiple iterations. The Metropolis-Hastings algorithm is visualized with two curves, one solid and one dashed, indicating the evolution of the samples towards the target distribution. The trace plot highlights the path of the samples over the iterations, with the `x`-axis ranging from -3 to 3 and the `y`-axis showing the density or probability values. The vertical line at `x=1` could indicate a specific target value or parameter in the context of the application of the Metropolis-Hastings algorithm.
```
dnorm(x, target_mu, target_sd)
```

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu, target\_sd})

Trace

Metropolis–Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3   -2   -1   0   1   2   3
\text{dnorm}(x, \text{target}_\mu, \text{target}_sd)
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3

\(\chi\)
\texttt{dnorm(x, target\_mu, target\_sd)}

\textbf{Trace}

\textbf{Metropolis–Hastings}
The diagram illustrates the Metropolis-Hastings algorithm. The trace plot shows the path of the algorithm as it samples from the target distribution. The Metropolis-Hastings distribution is represented by the dashed line, and the proposal distribution is shown by the solid line. The target distribution is the solid red curve, and the chain is the path taken by the algorithm. The trace plot provides insight into the mixing and convergence properties of the sampling process.
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\texttt{dnorm(x, target\_mu, target\_sd)}
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3

-3 -2 -1 0 1 2 3
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\begin{align*}
\text{Trace} \\
\text{Metropolis-Hastings}
\end{align*}
$dnorm(x, \text{target} \_\mu, \text{target} \_sd)$

Trace

Metropolis-Hastings
The diagram illustrates the function $dnorm(x, \text{target}_\mu, \text{target}_sd)$ and shows a trace plot with Metropolis-Hastings steps. The trace plot displays the evolution of samples drawn from the posterior distribution, with the Metropolis-Hastings acceptance probability kicks shown by the green dot. The x-axis represents values from $-3$ to $3$. The function is centered around zero with a standard deviation of $\text{target}_sd$. The trace plot highlights the convergence of the Markov chain to the target distribution.
$dnorm(x, \text{target\_mu, target\_sd})$

Trace

Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings
```r
dnorm(x, target_mu, target_sd)
```

**Trace**

**Metropolis-Hastings**
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3  -2  -1  0  1  2  3
The image shows a graph of a probability distribution function (PDF) of a normal distribution. The PDF is labeled as \( \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \). Below the PDF, there is a trace plot labeled as "Trace" which displays the path of samples generated by the Metropolis-Hastings algorithm. At the bottom, there is another plot labeled "Metropolis-Hastings" which appears to show the movement of the algorithm's samples over time.
```
\text{dnorm}(x, \text{target}_\text{mu}, \text{target}_\text{sd})
```
The diagram illustrates the Metropolis-Hastings algorithm. The top graph shows the density function `dnorm(x, target_mu, target_sd)` with a red solid line indicating the target distribution and a blue dashed line representing the proposal distribution. The middle graph is a trace plot showing the evolution of the Markov chain over iterations. The bottom graph displays the Metropolis-Hastings acceptance ratio, indicating how samples are accepted or rejected.
\texttt{dnorm(x, target\_mu, target\_sd)}
\texttt{dnorm(x, target_mu, target_sd)}

\textbf{Trace}

\textbf{Metropolis-Hastings}
dnorm(x, target_mu, target_sd)

Trace

Metropolis–Hastings

-3 -2 -1 0 1 2 3
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3  -2  -1  0  1  2  3
$$dnorm(x, \text{target\_mu}, \text{target\_sd})$$

Trace

Metropolis–Hastings

-3 -2 -1 0 1 2 3
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
$\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)$

Trace

Metropolis-Hastings
```
dnorm(x, target_mu, target_sd)
```
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
Metropolis–Hastings
$dnorm(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis--Hastings
$dnorm(x, \text{target}_\mu, \text{target}_sd)$

Trace

Metropolis–Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)

Trace

Metropolis-Hastings
$d\text{norm}(x, \text{target}_\mu, \text{target}_sd)$
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
$dnorm(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis–Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis–Hastings

-3  -2  -1  0  1  2  3
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3

-3 -2 -1 0 1 2 3
Metropolis-Hastings
$dnorm(x, \text{target}_\mu, \text{target}_{sd})$

Trace

Metropolis-Hastings
$$dnorm(x, \text{target}_{\mu}, \text{target}_{sd})$$
\text{dnorm}(x, \text{target}_\mu, \text{target}_{sd})

\begin{align*}
\text{Trace} \\
\text{Metropolis-Hastings}
\end{align*}

\begin{align*}
-3 & -2 & -1 & 0 & 1 & 2 & 3
\end{align*}
Metropolis–Hastings

\[ \text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma) \]
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis–Hastings
$\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis-Hastings

$\chi$
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\begin{align*}
\text{Trace} \\
\text{Metropolis-Hastings}
\end{align*}

\begin{align*}
-3 & -2 & -1 & 0 & 1 & 2 & 3 \\
\end{align*}
\texttt{dnorm(x, target\_mu, target\_sd)}
$\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis-Hastings
$$dnorm(x, \text{target}_\mu, \text{target}_\sigma)$$

Trace

Metropolis-Hastings
**dnorm(x, target_mu, target_sd)**

**Trace**

**Metropolis-Hastings**

-3  2  1  0  -1  -2  -3
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis–Hastings
The image shows a graph depicting a normal distribution function, denoted as $dnorm(x, \mu, \sigma)$, where $x$ is the variable, $\mu$ is the mean, and $\sigma$ is the standard deviation. The graph includes a trace plot and a Metropolis-Hastings algorithm. The trace plot displays the samples drawn from the distribution, and the Metropolis-Hastings plots show the evolution of the sampling process over iterations.
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target}\_\mu, \text{target}\_sd)
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
$dnorm(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis-Hastings
```
dnorm(x, target_mu, target_sd)
```

```
Metropolis-Hastings
```

Trace plot and Metropolis-Hastings trace showing the distribution and the movement of the sampling process.
\texttt{dnorm(x, target\_mu, target\_sd)}

\textbf{Trace}

\textbf{Metropolis-Hastings}
\textit{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis-Hastings
```
dnorm(x, target_mu, target_sd)
```

- **Trace**

- **Metropolis-Hastings**
\text{dnorm}(x, \text{target}_\mu, \text{target}_sd)

\text{Trace}

\text{Metropolis-Hastings}
\texttt{dnorm(x, target\_mu, target\_sd)}
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)

Trace

Metropolis–Hastings
The diagram illustrates the density function $dnorm(x, \text{target\_mu}, \text{target\_sd})$ in blue solid line and the target distribution in red dashed line. The trace plot shows the sample path of the Metropolis-Hastings algorithm with starting point at 0.5 and target distribution at 1. The Metropolis-Hastings method is used to sample from the target distribution by proposing new values within the range of -3 to 3 and accepting them based on the density ratio. The method is iterated 10,000 times, with 1,000 burn-in samples discarded to ensure the samples are from the stationary distribution.
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings

\(x\)
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
The image shows a plot with a normal distribution curve labeled `dnorm(x, target_mu, target_sd)` and a trace plot labeled `Trace`. The Metropolis-Hastings algorithm is also indicated with a dotted line. The x-axis ranges from -3 to 3.
The image contains a graph with various elements labeled as follows:

- **dnorm(x, target_mu, target_sd)**: This likely represents a function or distribution, possibly a normal distribution with parameters `target_mu` and `target_sd`.
- **Trace**: This term is often used in the context of Markov Chain Monte Carlo (MCMC) methods, indicating a trace plot that shows the evolution of the simulated values over iterations.
- **Metropolis-Hastings**: This is a method used in MCMC to generate a sequence of samples from a probability distribution, especially when direct sampling is difficult.

The graph likely illustrates the behavior of these elements, possibly showing how the distribution changes over iterations or how the Metropolis-Hastings algorithm operates. The axes and scales seem to be related to the parameters and the range of interest for the distributions.
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

\begin{align*}
\text{Trace} \\
\text{Metropolis-Hastings}
\end{align*}
Metropolis–Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

\textbf{Trace}

\textbf{Metropolis-Hastings}
The function `dnorm(x, target_mu, target_sd)` is illustrated in the diagram. The top plot shows the density function of a normal distribution with parameters `target_mu` and `target_sd`. The middle plot is a trace plot, which displays the samples generated by the Metropolis-Hastings algorithm over iterations. The bottom plot represents the Metropolis-Hastings acceptance ratio as a function of the parameter `x`. The graph highlights the relationship between the proposed and target distributions, indicating the acceptance decision at each step.
$dnorm(x, \text{target}_\mu, \text{target}_{sd})$
Metropolis–Hastings

Trace

dnorm(x, target_mu, target_sd)
\texttt{dnorm(x, target\_mu, target\_sd)}

-3 -2 -1 0 1 2

\texttt{Trace}

-3 -2 -1 0 1 2 3

\texttt{Metropolis-Hastings}
$dnorm(x, \text{target\_mu}, \text{target\_sd})$
$dnorm(x, \text{target\_mu, target\_sd})$

Trace

Metropolis–Hastings

$\theta$
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
Graph showing the distribution of Metropolis-Hastings sampling trajectories against the target distribution.
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
$\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)$

Trace

Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}
\text{dnorm}(x, \text{target} \_\mu, \text{target} \_sd)
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

\[\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})\]
The figure shows a plot of the density function (dnorm) of a normal distribution with parameters target_mu and target_sd. The trace plot below the density function illustrates the sampling process using the Metropolis-Hastings algorithm. The green dot indicates the final state of the sampling process.
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)

\text{Trace}

\text{Metropolis-Hastings}
$dnorm(x, target_mu, target_sd)$

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3
```r
dnorm(x, target_mu, target_sd)
```

Trace

Metropolis-Hastings

```
x
-3 -2 -1 0 1 2 3
```
$dnorm(x, \text{target\_mu}, \text{target\_sd})$
\[ \text{dnorm}(x, \text{target\_mu, target\_sd}) \]

-3  -2  -1  0  1  2  3
\text{dnorm}(x, \text{target}_\mu, \text{target}_sd)
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_\text{sd})
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
```
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
```

**Track**

**Metropolis-Hastings**
dnorm(x, target_mu, target_sd)
\text{dnorm}(x, \text{target}_{\mu}, \text{target}_{sd})

Trace

Metropolis-Hastings

\begin{align*}
&\text{dnorm}(x, \text{target}_{\mu}, \text{target}_{sd}) \\
&\text{Trace} \\
&\text{Metropolis-Hastings}
\end{align*}
\( \text{dnorm}(x, \text{target}_\mu, \text{target}_sd) \)
$$dnorm(x, \text{target\_mu}, \text{target\_sd})$$
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis–Hastings

-3 -2 -1 0 1 2 3
trace

Metropolis–Hastings

\text{dnorm}(x, \text{target}_\mu, \text{target}_sd)
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis–Hastings

\begin{align*}
\text{Trace} & = \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \\
\text{Metropolis–Hastings} & = \text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\end{align*}
$dnorm(x, \text{target_mu, target_sd})$

Trace

Metropolis–Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)

\begin{figure}
\centering
\includegraphics[width=\textwidth]{diagram.png}
\caption{Trace and Metropolis-Hastings trajectories for a normal distribution.}
\end{figure}

-3 -2 -1 0 1 2 3

\text{Metropolis-Hastings}
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}

-3 -2 -1 0 1 2 3

-3 -2 -1 0 1 2 3
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target}\_\mu, \text{target}\_sd)

\begin{align*}
\text{Trace} & \\
\text{Metropolis-Hastings} &
\end{align*}
The diagram illustrates the Metropolis-Hastings algorithm with a target distribution specified by `dnorm(x, target_mu, target_sd)`. The trace plot shows the sampling trajectory, indicating the transition between different states in the Markov chain. The Metropolis-Hastings kernel is depicted at the bottom, highlighting the acceptance criterion for transitioning from one state to another.
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\texttt{dnorm(x, target_mu, target_sd)}
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

\begin{figure}
\centering
\includegraphics[width=\textwidth]{diagram.png}
\caption{Trace and Metropolis-Hastings paths for a normal distribution.}
\end{figure}
```
dnorm(x, target_mu, target_sd)
```

- **Trace**

- **Metropolis-Hastings**
`dnorm(x, target_mu, target_sd)`
dnorm(x, target_mu, target_sd)
`dnorm(x, target_mu, target_sd)`

Trace

Metropolis-Hastings
The image contains a plot that illustrates the Metropolis-Hastings algorithm. The plot shows a target distribution (dashed line) and the proposal distribution (solid line). The trace plot demonstrates the path taken by the algorithm as it moves from one state to another. The Metropolis-Hastings process is used to sample from a probability distribution when direct sampling is difficult. The algorithm takes a proposal distribution and decides whether to accept or reject the next state based on the ratio of the target distribution at the current and proposed states.
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3

-3 -2 -1 0 1 2 3
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings
The image shows a graph with a normal distribution curve labeled \( \text{dnorm}(x, \text{target} \mu, \text{target} \sigma) \) in the top section. Below it, there is a trace plot labeled \( \text{Trace} \) indicating a sequence of samples from a Metropolis-Hastings algorithm, with a path that appears to explore the parameter space. At the bottom, there is a Metropolis-Hastings acceptance criterion, showing the acceptance probability of proposed moves, with a vertical line at \( \mu = 1 \) indicating the target mean, and the distribution ofaccepted samples.
$dnorm(x, \text{target\_mu}, \text{target\_sd})$
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
The diagram illustrates the Metropolis-Hastings algorithm with a normal distribution. The trace plot shows the evolution of the Markov chain over time. The Metropolis-Hastings probability distribution is depicted below the trace plot.
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
$dnorm(x, \text{target}_\mu, \text{target}_\sigma)$
\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
The diagram illustrates a comparison between the target distribution (solid red line) and the proposal distribution (dashed blue line) in a Metropolis-Hastings algorithm. The trace plot shows the trajectory of the Markov chain, indicating how the samples are drawn from the target distribution. The Metropolis-Hastings algorithm is effective in exploring the parameter space and generating samples that approximate the target distribution.
The diagram illustrates the Metropolis-Hastings method for sampling from a distribution. The top graph shows the target distribution (solid red line) and the proposal distribution (dashed blue line). The middle graph is a trace plot of the samples, indicating the Markov chain's path through the parameter space. The bottom graph depicts the Metropolis-Hastings acceptance probability, with the solid line representing the proposal distribution and the dashed line the target distribution. The acceptance ratio is given by:

\[
\text{Acceptance Ratio} = \min\left(1, \frac{p(\mathbf{x}) q(\mathbf{x} \mid \mathbf{x}^\prime)}{p(\mathbf{x}^\prime) q(\mathbf{x} \mid \mathbf{x})}\right)
\]
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
$dnorm(x, \text{target}_\mu, \text{target}_{sd})$
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3

-3 -2 -1 0 1 2 3
\text{dnorm}(x, \text{target}_\mu, \text{target}_sd)
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)

Trace

Metropolis-Hastings
The image contains a graph with a normal distribution curve labeled as $dnorm(x, \text{target\_mu}, \text{target\_sd})$. The graph includes two distributions, one solid and one dashed, indicating a comparison or overlay of two different normal distributions. The x-axis is labeled with values from -3 to 3, and the y-axis is not labeled, focusing on the density distribution of the normal curves.

The bottom part of the graph shows a Metropolis-Hastings trace plot, which illustrates the sampling process of the Markov chain Monte Carlo method. The trace plot is a visualization of the values generated by the algorithm, showing the evolution of the chain over iterations. The plot includes a black line representing the trace of the samples, and the x-axis spans from -3 to 3, with a green dot indicating a specific point on the trace.

The graph is likely used to demonstrate the characteristics of normal distributions and the effectiveness of the Metropolis-Hastings algorithm in sampling from a target distribution.
\texttt{dnorm(x, target.mu, target.sd)}

Trace

Metropolis-Hastings
\texttt{dnorm(x, target_mu, target_sd)}

Trace

Metropolis-Hastings
$$dnorm(x, \text{target}_\mu, \text{target}_\sigma)$$

Trace

Metropolis–Hastings
The diagram illustrates a normal distribution function $dnorm(x, \text{target}_\mu, \text{target}_\sigma)$ with two different distributions: one solid line and one dashed line. The solid line represents the target distribution, while the dashed line represents the Metropolis-Hastings proposal distribution. The upper portion of the diagram shows a trace plot of the sampling process, indicating the path taken by the chain in the parameter space. The lower portion of the diagram zooms into a specific region, highlighting the Metropolis-Hastings acceptance ratio. The horizontal line represents the value $x$, and the vertical line indicates the acceptance decision point, with a green dot marking the accepted sample.
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
The image shows a graph with a normal distribution curve (dnorm(x, target_mu, target_sd)) and a trace plot. The x-axis ranges from -3 to 3, and the y-axis is not labeled. The trace plot appears to show a random walk or Markov chain Monte Carlo (MCMC) sampling process. The Metropolis-Hastings algorithm is likely being used, as indicated by the title and the visualization of the sampling process.
$d\text{norm}(x, \text{target\_mu, target\_sd})$

Metropolis–Hastings

Trace

\[ x \]

\[ -3 \quad -2 \quad -1 \quad 0 \quad 1 \quad 2 \quad 3 \]
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)

Trace

Metropolis-Hastings
`dnorm(x, target_mu, target_sd)`

**Trace**

**Metropolis-Hastings**

-3 -2 -1 0 1 2 3
\text{dnorm}(x, \text{target}_\mu, \text{target}_sd)
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
The diagram illustrates the Metropolis-Hastings algorithm with a target distribution (solid red line) and the proposal distribution (dashed blue line). The trace plot shows the samples drawn during the MCMC simulation. The Metropolis-Hastings ratio is evaluated at each step to decide whether to accept or reject the proposed sample. The chain moves along the x-axis, indicating the evolution of the samples over iterations.
The diagram illustrates the Metropolis-Hastings algorithm. The top graph shows the target distribution (solid red line) and the proposal distribution (dashed blue line). The middle graph is a trace plot of the Markov chain, indicating the sequence of samples drawn from the target distribution. The bottom graph displays the density of the target and proposal distributions, illustrating how the proposal distribution is centered around the current state of the Markov chain.
\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]
The image shows a graph with the function `dnorm(x, target_mu, target_sd)` plotted. The graph includes a trace of samples from the Metropolis-Hastings algorithm, with a vertical line indicating the target distribution. The axes range from -3 to 3 on the x-axis and presumably from 0 to 1 on the y-axis. The plot illustrates the sampling process and the distribution of samples over multiple iterations.
\text{dnorm}(x, \text{target}\_\text{mu}, \text{target}\_\text{sd})

\begin{align*}
\text{Trace} \\
\text{Metropolis-Hastings}
\end{align*}
$\text{dnorm}(x, \text{target} \_\mu, \text{target} \_\text{sd})$

Trace

Metropolis–Hastings

$-3$  $-2$  $-1$  $0$  $1$  $2$  $3$
\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]
dnorm(x, target_mu, target_sd)
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\( dnorm(x, \text{target}_\mu, \text{target}_\sigma) \)

Trace

Metropolis–Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_sd)
\text{dnorm}(x, \text{target}\_\mu, \text{target}\_\text{sd})

\text{Trace}

\text{Metropolis–Hastings}
\text{dnorm}(x, \text{target}_\mu, \text{target}_\text{sd})

\text{Trace}

\text{Metropolis–Hastings}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis–Hastings}
dnorm(x, target_mu, target_sd)

Trace

Metropolis–Hastings
dnorm(x, target_mu, target_sd)
The diagram illustrates the function \(dnorm(x, \text{target}_\mu, \text{target}_\sigma)\) and a Metropolis-Hastings trace plot. The trace plot shows the evolution of the parameter over iterations, with a smooth transition curve highlighting the movement through the parameter space.
\textnormal{dnorm}(x, \text{target\_mu, target\_sd})

\textbf{Trace}

\textbf{Metropolis–Hastings}
The graph shows the normal distribution function \( \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \) with target mean \( \text{target\_mu} \) and standard deviation \( \text{target\_sd} \). The trace plot below it illustrates the sampling process, with Metropolis-Hastings iterations showing the movement along the distribution. The Metropolis-Hastings iterations are shown with dashed lines, indicating the proposal distribution and the accepted moves. The green dot on the x-axis represents the starting point for the sampling process.
`dnorm(x, target_mu, target_sd)`

Trace

Metropolis–Hastings
The image shows a graph with the function $dnorm(x, \text{target} \mu, \text{target} \sigma)$ plotted. The graph includes a trace plot and a Metropolis-Hastings chain, with the x-axis ranging from -3 to 3.
The diagram illustrates the relationship between a target distribution (red) and its proposal distribution (blue) in the context of Metropolis-Hastings sampling. The trace plot shows the evolution of the samples over time, with the Metropolis-Hastings plot indicating the acceptance of proposed moves. The function `dnorm(x, target_mu, target_sd)` is used to generate the target distribution.
The image contains a plot of a probability distribution function (PDF) and a trace plot. The PDF is plotted as a solid red line, and the trace plot is shown as a series of lines (trace points) in the middle section. The x-axis ranges from -3 to 3, with markers at -1, -2, and -3. The y-axis is labeled but not explicitly shown, with the assumption that it represents the probability density. The trace plot appears to be a representation of the sampling process, possibly from a Metropolis-Hastings algorithm, indicated by the dashed blue lines and the green dot which might represent the target distribution.
The diagram illustrates the use of the `dnorm` function, which represents the density of a normal distribution. The `dnorm` function is applied to a variable `x`, with parameters `target_mu` and `target_sd`. The trace plot shows the sequence of samples generated by the Metropolis-Hastings algorithm, indicating how the algorithm moves through the parameter space to approximate the distribution. The Metropolis-Hastings algorithm is a Markov chain Monte Carlo (MCMC) method used to obtain a sequence of samples from a probability distribution, which is often used in Bayesian inference. The algorithm works by proposing new samples and accepting or rejecting them based on a probability rule, ensuring that the samples converge to the desired distribution.
\text{dnorm}(x, \text{target\_mu, target\_sd})
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\texttt{dnorm(x, target\_mu, target\_sd)}
$dnorm(x, \text{target}_{\mu}, \text{target}_{sd})$
```
dnorm(x, target_mu, target_sd)
```
dnorm(x, target.mu, target.sd)

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3

x
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\textbf{Metropolis–Hastings}

dnorm(x, target_mu, target_sd)
$$dnorm(x, \text{target\_mu, target\_sd})$$

Trace

Metropolis–Hastings
\text{dnorm}(x, \text{target \_mu}, \text{target \_sd})

\text{Trace}

\text{Metropolis-Hastings}
The image shows a plot with the following features:

- The top graph represents a density function, specifically `dnorm(x, target_mu, target_sd)`, where `x` is the variable, `target_mu` is the mean, and `target_sd` is the standard deviation.

- The middle section is labeled as a `Trace` plot, which typically displays the trajectory of samples drawn from a posterior distribution during a Markov Chain Monte Carlo (MCMC) simulation.

- The bottom graph is labeled as a `Metropolis-Hastings` plot, indicating a comparison or a similar function to the one in the top graph, possibly illustrating the acceptance probability of proposals in a Metropolis-Hastings algorithm.

The plot spans from -3 to 3 on the x-axis, with tick marks at -3, -2, -1, 0, 1, 2, and 3. The y-axis is not explicitly labeled but corresponds to the density function values.
The diagram illustrates a Metropolis-Hastings algorithm with a normal distribution. The figure shows the target distribution (solid red line) and the proposal distribution (dashed blue line). The trace shows the evolution of the sampling process over iterations.
\text{dnorm}(x, \text{target\_mu, target\_sd})

\textbf{Trace}

\textbf{Metropolis-Hastings}
The image contains a graph with the title "dnorm(x, target_mu, target_sd)". The graph shows a normal distribution curve with a solid red line and a dashed blue line. Below the graph, there is another graph labeled "Trace" with a series of horizontal lines indicating the trace of the samples. The bottom graph is labeled "Metropolis-Hastings" and shows two probability density functions with a green dot indicating a sample point. The x-axis ranges from -3 to 3.
The figure illustrates the distribution of a normal density function (dnorm(x, target_mu, target_sd)) and the corresponding trace plot from a Metropolis-Hastings algorithm. The trace plot visualizes the random walk through the parameter space, showing the path of the sampled values.
dnorm(x, target_mu, target_sd)
The diagram illustrates the Metropolis-Hastings algorithm, which is a Markov chain Monte Carlo (MCMC) method for obtaining a sequence of random samples from a probability distribution. The top graph shows a normal distribution (solid red line) and another distribution (dashed blue line). The middle graph is a trace plot that tracks the evolution of the chain over its iterations. The bottom graph depicts the Metropolis-Hastings acceptance ratio, comparing the target distribution with the proposal distribution.
```
dnorm(x, target_mu, target_sd)
```

Traces and Metropolis-Hastings plots are shown, with the target distribution (solid red line) and the proposal distribution (dashed blue line). The vertical line indicates the accepted value after a proposal. The x-axis ranges from -3 to 3.
The graph shows the normal distribution function $dnorm(x, \text{target\_mu}, \text{target\_sd})$ with a solid red line. The blue dashed line represents the Metropolis-Hastings algorithm's trace over iterations. The horizontal axis is labeled with values from -3 to 3, and the vertical axis is labeled with the Metropolis-Hastings iterations.
trace

Metropolis–Hastings

dnorm(x, target_mu, target_sd)
$dnorm(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis-Hastings
The figure illustrates a comparison between the target distribution (solid red line) and the proposal distribution (dashed blue line) using the Metropolis-Hastings algorithm. The trace plot shows the samples drawn from the target distribution, indicating the exploration of the parameter space.

The Metropolis-Hastings algorithm is a Markov Chain Monte Carlo (MCMC) method used to obtain a sequence of samples from a probability distribution when direct sampling is difficult. This method is particularly useful for complex distributions that are defined over high-dimensional spaces.
\[ \text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma) \]
\texttt{dnorm(x, target_mu, target_sd)}

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3

-3 -2 -1 0 1 2 3
$dnorm(x, \text{target}\_\mu, \text{target}\_\sigma)$

**Trace**

**Metropolis–Hastings**
\text{dnorm}(x, \text{target}_\mu, \text{target}_\text{sd})

\text{Trace}

\text{Metropolis-Hastings}
Metropolis-Hastings
The image shows a graph with two normal distributions: one red and one blue. The red curve is the target distribution, and the blue curve is the proposal distribution. The graph also includes a trace plot that illustrates the sampling process in Metropolis-Hastings MCMC, with the vertical line indicating the target parameter value.
\text{dnorm}(x, \text{target}\_\text{mu}, \text{target}\_\text{sd})
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis−Hastings

-3
-2
-1
0
1
2
3
dnorm(x, target_mu, target_sd)

Trace

Metropolis–Hastings

-3 -2 -1 0 1 2 3
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3
The diagram illustrates the Metropolis-Hastings algorithm. The top graph shows the target distribution (solid red line) and the proposal distribution (dashed blue line). The middle graph is a trace plot of the Markov chain samples. The bottom graph displays the Metropolis-Hastings acceptance probability.
dnorm(x, target_mu, target_sd)
The image shows a graph with a normal distribution curve labeled as \(\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)\). The graph also includes a trace plot and a Metropolis-Hastings plot. The trace plot is a series of lines indicating the sampling process, while the Metropolis-Hastings plot shows the transition between different states of the sampling process.
\texttt{dnorm(x, target\_mu, target\_sd)}

\texttt{Trace}

\texttt{Metropolis-Hastings}
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
$dnorm(x, \text{target}_\mu, \text{target}_{sd})$

Trace

Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}
\text{dnorm}(x, \text{target\_mu, target\_sd})

Trace

Metropolis–Hastings
$\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)$
The figure shows a plot of the normal distribution function $d\text{norm}(x, \text{target}_\mu, \text{target}_\sigma)$ against $x$. The trace plot at the top illustrates the samples generated by the Metropolis-Hastings algorithm, with the solid and dashed lines representing two different runs of the algorithm. The Metropolis-Hastings plots at the bottom compare the target distribution with the samples generated, showing how the algorithm converges to the target distribution.
\textbf{Trace}\n
\textbf{Metropolis–Hastings}\n
\textbf{dnorm(x, target_mu, target_sd)}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

Trace

Metropolis–Hastings
\text{dnorm}(x, \text{target}\_\mu, \text{target}\_sd)

\text{Trace}

\text{Metropolis–Hastings}
$dnorm(x, \text{target}_\mu, \text{target}_\sigma)$

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
Metropolis–Hastings
$dnorm(x, \text{target}_{\mu}, \text{target}_{sd})$

Trace

Metropolis–Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis–Hastings
$dnorm(x, \text{target\_mu}, \text{target\_sd})$
\texttt{dnorm(x, target\_mu, target\_sd)}

\textbf{Trace}

\textbf{Metropolis–Hastings}
```
dnorm(x, target_mu, target_sd)
```

Trace

Metropolis-Hastings
The diagram illustrates the Metropolis-Hastings algorithm. The top panel shows a normal distribution function, $\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)$, which represents the target distribution. The middle panel is a trace plot, which tracks the sequence of samples generated by the algorithm, showing how the samples evolve over iterations. The bottom panel depicts the Metropolis-Hastings proposal distribution, demonstrating the acceptance of a new sample based on the ratio of the target distribution to the proposal distribution. The trace plot visually confirms the exploration of the parameter space, with a focus on the region around $\mu$. The Metropolis-Hastings step is critical for the algorithm's ability to move between points in the parameter space, ensuring that the samples are drawn from the target distribution.
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})\)
\texttt{dnorm(x, target\_mu, target\_sd)}
dnorm(x, target_mu, target_sd)
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\begin{align*}
\text{Trace} & \\
\text{Metropolis-Hastings} & \\
\end{align*}
Metropolis-Hastings

```
dnorm(x, target_mu, target_sd)
```

Trace

```
-3 -2 -1 0 1 2 3
```

Metropolis-Hastings
\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]
\text{dnorm}(x, \text{target}_\mu, \text{target}_sd)

Trace

Metropolis-Hastings

-3  -2  -1  0   1   2   3

\[ -3 \quad -2 \quad -1 \quad 0 \quad 1 \quad 2 \quad 3 \]
```r
dnorm(x, target_mu, target_sd)
```
The graph shows the Metropolis-Hastings algorithm in action. The upper graph illustrates the target distribution and the proposal distribution. The middle graph is the trace plot, showing the path of the samples generated by the algorithm. The lower graph displays the density functions for the target and proposal distributions. The x-axis represents the variable x, and the y-axis represents the probability density function.
\texttt{dnorm(x, target\_mu, target\_sd)}
\text{dnorm}(x, \text{target}\_\text{mu}, \text{target}\_\text{sd})

Trace

Metropolis–Hastings
$$dnorm(x, \text{target}\_\mu, \text{target}\_sd)$$

Trace

Metropolis–Hastings
The diagram shows a plot of the function $dnorm(x, \text{target}_\mu, \text{target}_\sigma)$, which represents a normal distribution with specified mean and standard deviation. The trace plot below the function shows the paths of samples generated by the Metropolis-Hastings algorithm, indicating how the samples evolve over iterations. The lower part of the diagram illustrates the Metropolis-Hastings steps with solid and dashed curves, highlighting the acceptance and rejection of proposed samples.
$dnorm(x, \text{target\_mu, target\_sd})$
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\[
d\text{norm}(x, \text{target\_mu}, \text{target\_sd})
\]

Trace

Metropolis-Hastings
Metropolis–Hastings

Trace

dnorm(x, target_mu, target_sd)
\texttt{dnorm(x, target\_mu, target\_sd)}
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3

-3 2
`dnorm(x, target_mu, target_sd)`

Trace

Metropolis-Hastings
$dnorm(x, target\_mu, target\_sd)$

Trace

Metropolis–Hastings
\texttt{dnorm(x, target_mu, target_sd)}

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
The plot shows a normal distribution with a mean (`target_mu`) and standard deviation (`target_sd`). The trace plot (Trace) indicates the path of samples drawn from the distribution. The Metropolis-Hastings algorithm is used to generate these samples, which are shown by the black lines. The solid line represents the target distribution, and the dashed line represents the proposal distribution. The diagram also includes a vertical line indicating a particular point of interest in the distribution.
The diagram illustrates the Metropolis-Hastings algorithm, a Markov Chain Monte Carlo (MCMC) method used for sampling from probability distributions. The top part shows the target distribution (solid red line) and the proposal distribution (dashed blue line). The middle part is the trace plot, which tracks the progression of samples drawn from the proposal distribution towards the target distribution. The bottom part demonstrates how the Metropolis-Hastings algorithm decides whether to accept or reject a proposed move based on the ratio of the target distribution at the current and proposed states. The process iterates, refining the samples to better approximate the true distribution.
\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]
dnorm(x, target_mu, target_sd)
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis–Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\begin{align*}
\text{Trace} & \\
\text{Metropolis-Hastings} & \\
\end{align*}
`dnorm(x, target_mu, target_sd)`

Trace

Metropolis-Hastings
The image depicts a graphical representation of a Metropolis-Hastings algorithm. The top section shows a density function, possibly of a normal distribution, with a dashed line and a solid line indicating the target distribution and the proposal distribution, respectively. The middle section is labeled as "Trace" and displays a series of vertical lines representing the samples drawn from the distribution. The bottom section is labeled as "Metropolis-Hastings" and shows a single sample path, with a solid line and a dashed line indicating the movement of the proposal distribution towards the target distribution.
Metropolis–Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
\text{dnorm}(x, \text{target}_\mu, \text{target}_\text{sd})

\text{Trace}

\text{Metropolis-Hastings}
Metropolis–Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis–Hastings}
\texttt{dnorm(x, target\_mu, target\_sd)}

\begin{align*}
\text{Trace} \\
\text{Metropolis-Hastings}
\end{align*}
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)

\begin{align*}
\text{Trace} \\
\text{Metropolis-Hastings}
\end{align*}
\begin{align*}
\text{dnorm}(x, \text{target}_\mu, \text{target}_\text{sd})
\end{align*}

\begin{align*}
\text{Trace}
\end{align*}

\begin{align*}
\text{Metropolis–Hastings}
\end{align*}

-3 -2 -1 0 1 2 3
\[ \text{dnorm}(x, \text{target}\_\mu, \text{target}\_\sigma) \]

```
# Trace
-3
-2
-1
0
1
2
3

# Metropolis–Hastings
```

```
We can see the distribution of the values
```
\texttt{dnorm}(x, \text{target_mu, target_sd})

\textit{Trace}

\textit{Metropolis-Hastings}
\texttt{dnorm(x, target\_mu, target\_sd)}
$dnorm(x, \text{target}_\mu, target_{sd})$
\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]

Trace

Metropolis–Hastings

-3 -2 -1 0 1 2 3
\text{dnorm}(x, \text{target\_mu, target\_sd})

\begin{align*}
\text{Trace} \\
\text{Metropolis–Hastings}
\end{align*}

\begin{align*}
&\text{−3} & \text{−2} & \text{−1} & \text{0} & \text{1} & \text{2} & \text{3} \\
&\text{−3} & \text{−2} & \text{−1} & \text{0} & \text{1} & \text{2} & \text{3}
\end{align*}
$dnorm(x, \text{target}_\mu, \text{target}_\sigma)$
```
dnorm(x, target_mu, target_sd)
```

Trace

Metropolis-Hastings

![Graph showing dnorm(x, target_mu, target_sd), Trace, and Metropolis-Hastings distributions.](image-url)
The diagram illustrates the use of the `dnorm` function for generating normal distribution with target mean (`target_mu`) and standard deviation (`target_sd`). The trace plot shows the sampled values from a Metropolis-Hastings algorithm, indicating the distribution's density and sampling process. The Metropolis-Hastings plot below emphasizes the transition probability with dotted lines, highlighting the acceptance criteria for new samples. The vertical line represents a potential sample point, with the green dot indicating acceptance or rejection based on the proposed move.
$dnorm(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis–Hastings

$-3$ $-2$ $-1$ $0$ $1$ $2$ $3$
The graph shows a normal distribution function (red solid line) and a Metropolis-Hastings trace plot (blue dashed line) for a target distribution. The trace plot demonstrates the sampling process, where each point represents a sample from the target distribution. The Metropolis-Hastings algorithm is a Markov Chain Monte Carlo (MCMC) method used to obtain a sequence of samples from a probability distribution.
\texttt{dnorm(x, target\_mu, target\_sd)}

\texttt{Trace}

\texttt{Metropolis-Hastings}
$dnorm(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis-Hastings
$dnorm(x, \text{target}_\mu, \text{target}_\sigma)$

Trace

Metropolis-Hastings
The figure illustrates the Metropolis-Hastings algorithm applied to a normal distribution. The top graph shows the density function (dnorm) of a normal distribution with parameters `target_mu` and `target_sd`. The middle graph is a trace plot of the simulated values, indicating the sampling process. The bottom graph depicts the Metropolis-Hastings proposal distribution, which is used to decide whether to accept or reject new samples.
\texttt{dnorm(x, target\_mu, target\_sd)}
The image shows a plot of a normal distribution function, $dnorm(x, \text{target}\_mu, \text{target}\_sd)$, with the x-axis ranging from -3 to 3. The graph includes a trace plot and a Metropolis-Hastings proposal distribution, indicating the sampling process used in Bayesian inference. The trace plot visualizes the sampling path, while the Metropolis-Hastings proposal distribution shows the proposed moves in the parameter space.
\texttt{dnorm(x, target_mu, target_sd)}
The diagram illustrates the Metropolis-Hastings algorithm in the context of a normal distribution with a specified mean and standard deviation. The top plot shows the target distribution (solid line) and the proposal distribution (dashed line) for a random variable $x$. The middle plot is a trace plot of the Markov chain samples, which indicates the progression of the sampling process over iterations. The bottom plot compares the target distribution with the proposal distribution, highlighting the acceptance of moves in the sampling process. The horizontal line at $x$ represents the point at which a candidate move is proposed, and the decision to accept or reject the move is based on the ratio of the proposal and target distribution densities.
The diagram illustrates the function $\text{dnorm}(x, \text{target}_{\mu}, \text{target}_{\text{sd}})$ with a red solid line. Below, a trace plot is shown with multiple black lines representing the trace over iterations. The Metropolis-Hastings algorithm is depicted with a blue dashed line, contrasting with the target distribution. The x-axis ranges from -3 to 3.
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3
Metropolis–Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis–Hastings
$dnorm(x, \text{target}_\mu, \text{target}_{sd})$

Trace

Metropolis–Hastings
\text{dnorm}(x, \text{target}\_\text{mu}, \text{target}\_\text{sd})
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target}\_\mu, \text{target}\_sd)
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\textbf{Traffic}

\textbf{Metropolis-Hastings}
```
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
```
`dnorm(x, target_mu, target_sd)`

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target}_{\mu}, \text{target}_{\text{sd}})

Trace

Metropolis–Hastings
$\text{dnorm}(x, \text{target}\_\mu, \text{target}\_sd)$

Trace

Metropolis–Hastings

$x$
dnorm(x, target_mu, target_sd)
The image shows a graph with two curves. The red curve represents the standard normal distribution, denoted as \( \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \). The blue dashed curve represents the Metropolis-Hastings algorithm. The x-axis is labeled with \( x \) and the y-axis is labeled with the standard normal density function. The grid lines are marked at intervals of \( -3, -2, -1, 0, 1, 2, 3 \).
\texttt{dnorm(x, target\_mu, target\_sd)}

\textbf{Trace}

\textbf{Metropolis–Hastings}
$$dnorm(x, \text{target\_mu, target\_sd})$$
\text{dnorm}(x, \text{target\_mu, target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
\texttt{dnorm(x, target\_mu, target\_sd)}
```
dnorm(x, target_mu, target_sd)
```
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
$dnorm(x, \text{target\_mu, target\_sd})$

Trace

Metropolis-Hastings
The diagram illustrates the behavior of the Metropolis-Hastings algorithm. The top graph shows the target distribution, represented by the solid red line. The dashed blue line indicates the proposal distribution. The middle graph is a trace plot showing the samples generated by the algorithm over iterations. The bottom graph displays the acceptance probability, which is also shown by the dashed blue line. The vertical line indicates the iteration step where the algorithm accepts or rejects a proposal.
The graph shows the distribution of a normal random variable with mean \( \mu \) and standard deviation \( \sigma \). The solid red line represents the true distribution, while the dashed blue line represents the proposal distribution used in the Metropolis-Hastings algorithm. The trace plot below the distribution graph demonstrates the trajectory of the Markov chain generated by the algorithm. The Metropolis-Hastings graph on the right compares the proposal distribution to the target distribution, illustrating the acceptance ratio.
The diagram shows a normal distribution represented by the function `dnorm(x, target_mu, target_sd)`. The trace plot demonstrates the samples drawn from the distribution, and the Metropolis-Hastings algorithm is illustrated below with the acceptance probability shown in blue dashed lines.
\[ \text{dnorm}(x; \text{target}_\mu, \text{target}_\sigma) \]
\texttt{dnorm(x, target\_mu, target\_sd)}

\textbf{Trace}

\textbf{Metropolis-Hastings}
Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
$$dnorm(x, \text{target}_\mu, \text{target}_sd)$$

**Trace**

**Metropolis-Hastings**
The graph shows a normal distribution curve (dnorm(x, target_mu, target_sd)) with two traces below it. The Metropolis-Hastings algorithm is applied to the distribution, indicated by the scatter of points in the trace. The x-axis represents the variable X, and the y-axis represents the probability density.
$dnorm(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis–Hastings
\[ \text{dnorm}(x, \text{target}_\mu, \text{target}_sd) \]

Trace

Metropolis–Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis–Hastings
The image shows a plot of a normal distribution function (dnorm(x, target_mu, target_sd)) with a target mean (target_mu) and standard deviation (target_sd). The upper part of the plot displays the distribution curve, while the lower part shows a trace plot. The x-axis represents the range from -3 to 3, and the y-axis represents the probability density. The Metropolis-Hastings algorithm is indicated by the dotted line, and the trace plot illustrates the samples drawn from the distribution.
\[ \text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma) \]
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
```
dnorm(x, target_mu, target_sd)
```

**Trace**

**Metropolis-Hastings**
The figure illustrates the relationship between the normal distribution and the Metropolis-Hastings algorithm. The top panel shows the normal distribution function, $dnorm(x, target\_mu, target\_sd)$, with a solid line representing the target distribution and a dashed line representing the proposal distribution.

The middle panel is a trace plot, which is a series of horizontal lines that represent the sampled values from the Metropolis-Hastings algorithm. This plot helps visualize the path followed by the algorithm as it samples from the target distribution.

The bottom panel shows the Metropolis-Hastings algorithm in action. The solid line represents the acceptance probability distribution, and the dashed line shows the proposal distribution. The green dot indicates a point where a sample was accepted.
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
dnorm(x, target_mu, target_sd)
\[ \text{dnorm(x, target\_mu, target\_sd)} \]

**Trace**

**Metropolis-Hastings**

\[ \text{Metropolis-Hastings} \]
The image shows a graph with the title "dnorm(x, target_mu, target_sd)". The graph contains a normal distribution curve (solid red line) and a Metropolis-Hastings trace (dotted blue line). The x-axis is labeled with values from -3 to 3, and the y-axis is labeled as "dnorm(x, target_mu, target_sd)". The trace includes a vertical line indicating a specific value on the x-axis.
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\text{dnorm}(x, \text{target\_mu, target\_sd})

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
\texttt{dnorm(x, target\_mu, target\_sd)}

\textbf{Trace}

\textbf{Metropolis−Hastings}
\texttt{dnorm(x, target\_mu, target\_sd)}

-3
-2
-1
0
1
2
3

Trace

Metropolis-Hastings

-3
-2
-1
0
1
2
3
\begin{align*}
d\text{norm}(x, \text{target}_\mu, \text{target}_\sigma)
\end{align*}
```
dnorm(x, target_mu, target_sd)
```

Trace

Metropolis-Hastings
$dnorm(x, \text{target\_mu}, \text{target\_sd})$
Metropolis-Hastings
$dnorm(x, target\_mu, target\_sd)$

Trace

Metropolis–Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

\begin{align*}
\text{Trace} \\
\text{Metropolis–Hastings}
\end{align*}
```
dnorm(x, target_mu, target_sd)
```

Trace

Metropolis–Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_{sd})
The figure illustrates a normal distribution curve (dnorm) with a target mean and standard deviation. The trace plot shows the sampling process over multiple iterations. The Metropolis-Hastings algorithm is used to simulate samples from a posterior distribution, as indicated by the dashed line representing the proposal distribution and the solid line the chain trace.
The diagram illustrates the concept of Metropolis-Hastings, a Markov chain Monte Carlo method used for sampling from a probability distribution. The top part shows the target distribution (red solid line) and the proposal distribution (blue dashed line). The middle part is a trace plot of the Markov chain, indicating the path of samples. The bottom part further details the Metropolis-Hastings algorithm, with the acceptance region highlighted by the green circle.
$$dnorm(x, \text{target}_\mu, \text{target}_\text{sd})$$

Trace

Metropolis–Hastings
$dnorm(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis–Hastings
dnorm(x, target.mu, target.sd)

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\text{Trace}

\text{Metropolis-Hastings}
"dnorm(x, target_mu, target_sd)"

"Trace"

"Metropolis-Hastings"
$dnorm(x, target\_mu, target\_sd)$

Trace

Metropolis-Hastings
The image shows a plot of a normal distribution function, $dnorm(x, \text{target\_mu}, \text{target\_sd})$, with the trace and Metropolis-Hastings steps overlaid. The trace lines represent the samples generated by the Metropolis-Hastings algorithm, showing the path the samples took during the simulation. The Metropolis-Hastings algorithm is a Markov Chain Monte Carlo (MCMC) method used to sample from a probability distribution when direct sampling is difficult. The target distribution is visualized by the smooth curve, and the Metropolis-Hastings proposal distribution is indicated by the dashed line.
trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu, target\_sd})
The diagram illustrates the concept of Metropolis-Hastings MCMC algorithm. The top graph shows the distribution of the target density function, while the bottom graph represents the trace of the MCMC sampler. The Metropolis-Hastings algorithm is used to generate samples from a probability distribution, where the probability density function is given by $dnorm(x, \text{target}_\mu, \text{target}_\sigma)$.
\texttt{dnorm(x, target\_mu, target\_sd)}
\text{dnorm}(x, \text{target} \_\text{mu}, \text{target} \_\text{sd})

Trace

Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}
$dnorm(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis-Hastings
\[ \text{dnorm}(x, \text{target\_mu}, \text{target\_sd}) \]

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
\text{dnorm}(x, \text{target}_\mu, \text{target}_s_d)
The image contains various plots and visualizations related to statistical distributions. The top plot shows a normal distribution curve labeled `dnorm(x, target_mu, target_sd)`. Below that, there is a `Trace` plot, which appears to display a series of points or samples, likely from a Markov Chain Monte Carlo (MCMC) simulation. The bottom plot includes two overlapping distributions labeled `Metropolis-Hastings`, with one being a normal distribution and the other a more skewed distribution, indicating samples or transitions between distributions.
$dnorm(x, \text{target\_mu}, \text{target\_sd})$

Trace

Metropolis–Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis–Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis–Hastings
$\text{dnorm}(x, \text{target}\_\mu, \text{target}\_sd)$

Trace

Metropolis–Hastings
```
dnorm(x, target_mu, target_sd)
```

Trace

Metropolis-Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

\texttt{Metropolis-Hastings}
\text{dnorm}(x, \text{target} \_\text{mu}, \text{target} \_\text{sd})

\begin{align*}
&\text{Trace} \\
&\text{Metropolis-Hastings}
\end{align*}
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\begin{align*}
\text{Trace} & \\
\text{Metropolis-Hastings} & 
\end{align*}
The diagram illustrates a Metropolis-Hastings sampler for a normal distribution. The top panel shows the target distribution, while the bottom panel displays the Metropolis-Hastings proposal distribution. The trace plot in the middle demonstrates the path of the sampler through the parameter space.
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3
\texttt{dnorm(x, target\_mu, target\_sd)}

\texttt{Metropolis-Hastings}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\begin{align*}
\text{Trace} \\
\text{Metropolis\textendash}Hastings
\end{align*}
\( \text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma) \)

Trace

Metropolis–Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings
dnorm(x, target_mu, target_sd)

Trace

Metropolis–Hastings
The diagram illustrates the Metropolis-Hastings algorithm for approximating a probability distribution. The top panel shows the target distribution (red line) and the candidate distribution (blue line). The middle panel is the trace plot of the sampling process. The bottom panel depicts the acceptance criterion for the sampling process.
d_{\text{norm}}(x, \text{target}_\mu, \text{target}_\sigma)
\texttt{dnorm(x, target\_mu, target\_sd)}

\textbf{Trace}

\textbf{Metropolis-Hastings}
\text{dnorm}(x, \text{target}_\mu, \text{target}_\text{sd})
$$dnorm(x, \text{target}_\mu, \text{target}_\sigma)$$

Trace

Metropolis–Hastings
\texttt{dnorm(x, target\_mu, target\_sd)}
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})
The diagram illustrates a normal distribution function, \( \text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma) \), with a solid red line representing the distribution and a dashed blue line indicating a track. The trace plot at the bottom shows the trajectory of the sampling process. The Metropolis-Hastings algorithm is depicted with a blue dashed line, traversing the distribution space.
dnorm(x, target_mu, target_sd)

Trace

Metropolis−Hastings

\(-3\) \(-2\) \(-1\) \(0\) \(1\) \(2\) \(3\)
\text{dnorm}(x, \text{target}_\mu, \text{target}_\sigma)
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\begin{align*}
\text{Trace} \\
\text{Metropolis–Hastings}
\end{align*}
\[\text{dnorm}(x, \text{target}\_\mu, \text{target}\_sd)\]

Trace

Metropolis–Hastings
\text{dnorm}(x, \text{target\_mu}, \text{target\_sd})

\begin{align*}
\text{Trace} & \\
\text{Metropolis-Hastings} &
\end{align*}
dnorm(x, target_mu, target_sd)

Trace

Metropolis-Hastings
\text{dnorm}(x, \text{target}_\mu, \text{target}_\text{sd})
The image shows a graph with the function `dnorm(x, target_mu, target_sd)` plotted. The x-axis ranges from -3 to 3. The graph includes a trace plot labeled "Trace" and another labeled "Metropolis-Hastings."
The image shows a plot with the following features:

- The top graph displays a normal distribution (dnorm) with parameters \( x, \text{target}_\mu, \text{target}_\sigma \).
- The middle graph is labeled as "Trace" and contains a complex pattern of lines indicating a trace plot.
- The bottom graph is labeled as "Metropolis-Hastings" and shows a similar pattern of lines, possibly representing samples from a Metropolis-Hastings algorithm.

The x-axis ranges from -3 to 3, and the y-axis corresponds to the respective parameters of the distributions.
\texttt{dnorm(x, target\_mu, target\_sd)}

Trace

Metropolis-Hastings

-3 -2 -1 0 1 2 3

\(\xi\)

1 2 3
$dnorm(x, \text{target}\_\mu, \text{target}\_\text{sd})$

Trace

Metropolis–Hastings
Metropolis–Hastings
The figure illustrates the Metropolis-Hastings algorithm for a normal distribution. The top graph shows the target distribution (solid red line) and the proposal distribution (dashed blue line). The middle graph is a trace plot, which visualizes the samples drawn during the Markov chain. The bottom graph displays the Metropolis-Hastings acceptance ratio.
\text{dnorm}(x, \text{target}_{\text{mu}}, \text{target}_{\text{sd}})

\text{Trace}

\text{Metropolis-Hastings}