1. Transform the equation \( x^{(4)} + 6x'' - 3x' + x = \cos 3t \) into a system of first-order differential equations, and write it in matrix form.

2. Transform the equation \( t^3 x''' - 2t^2 x'' + 3tx' + 5x = \ln t \) into a system of first-order differential equations, and write it in matrix form.

3. Rewrite the system of equations below in matrix form:
\[
\begin{cases}
x' = (\sin t)x - e^ty + \cos t \\
y' = x - 3z + t^2 \\
z' = 6y - 7z + t^3
\end{cases}
\]

4. Rewrite the system of equations below in matrix form:
\[
\begin{cases}
x' = -y + 3z + \sin t \\
y' = 3x - 7z + \cos t \\
z' = tx + e^ty - 3tz + 1
\end{cases}
\]

5. Solve the following system of equations by first eliminating one of the variables:
\[
\begin{cases}
x' = -y \\
y' = 13x + 4y , \ x(0) = 0, \ y(0) = 3.
\end{cases}
\]

6. Find the general solution to the system of the equations below by first eliminating one of the variables:
\[
\begin{cases}
x'' = 6x + 2y \\
y'' = 3x + 7y
\end{cases}
\]

7. Find the general solution to the system of the equations below by first eliminating one of the variables:
\[
\begin{cases}
x' = 4x + y + 2t \\
y' = -2x + y
\end{cases}
\]

8. Using the eigenvalue method to solve the system:
\[
\begin{cases}
x' = x + 2y \\
y' = 2x + y
\end{cases}
\]

9. Using the eigenvalue method to solve the initial value problem:
\[
\begin{cases}
x' = 9x + 5y \\
y' = -6x - 2y , \ x(0) = 1, \ y(0) = 0.
\end{cases}
\]

10. Using the eigenvalue method to solve the initial value problem:
\[
\begin{cases}
x' = 3x + 4y \\
y' = 3x + 2y , \ x(0) = 1, \ y(0) = 1.
\end{cases}
\]