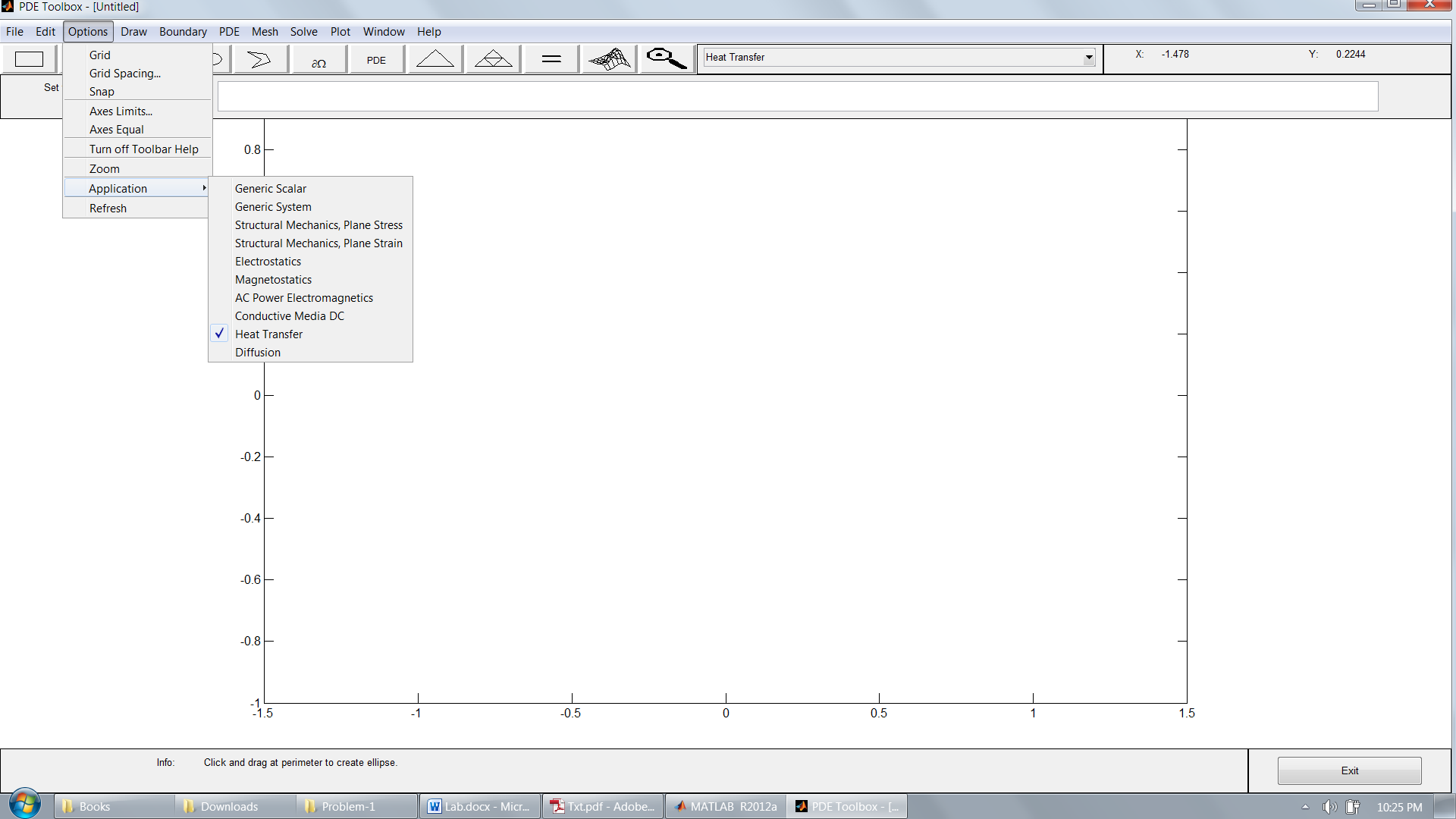
**QUICK START GUIDE FOR MATLAB PDE SOLVER**

1. **Open MATLAB and select the ‘APPS’ tab. Select “PDE Modeler”**
2. **Once PDE Modeler is open go to the ‘Options’ menu and under ‘Applications’ select ‘Heat Transfer’**

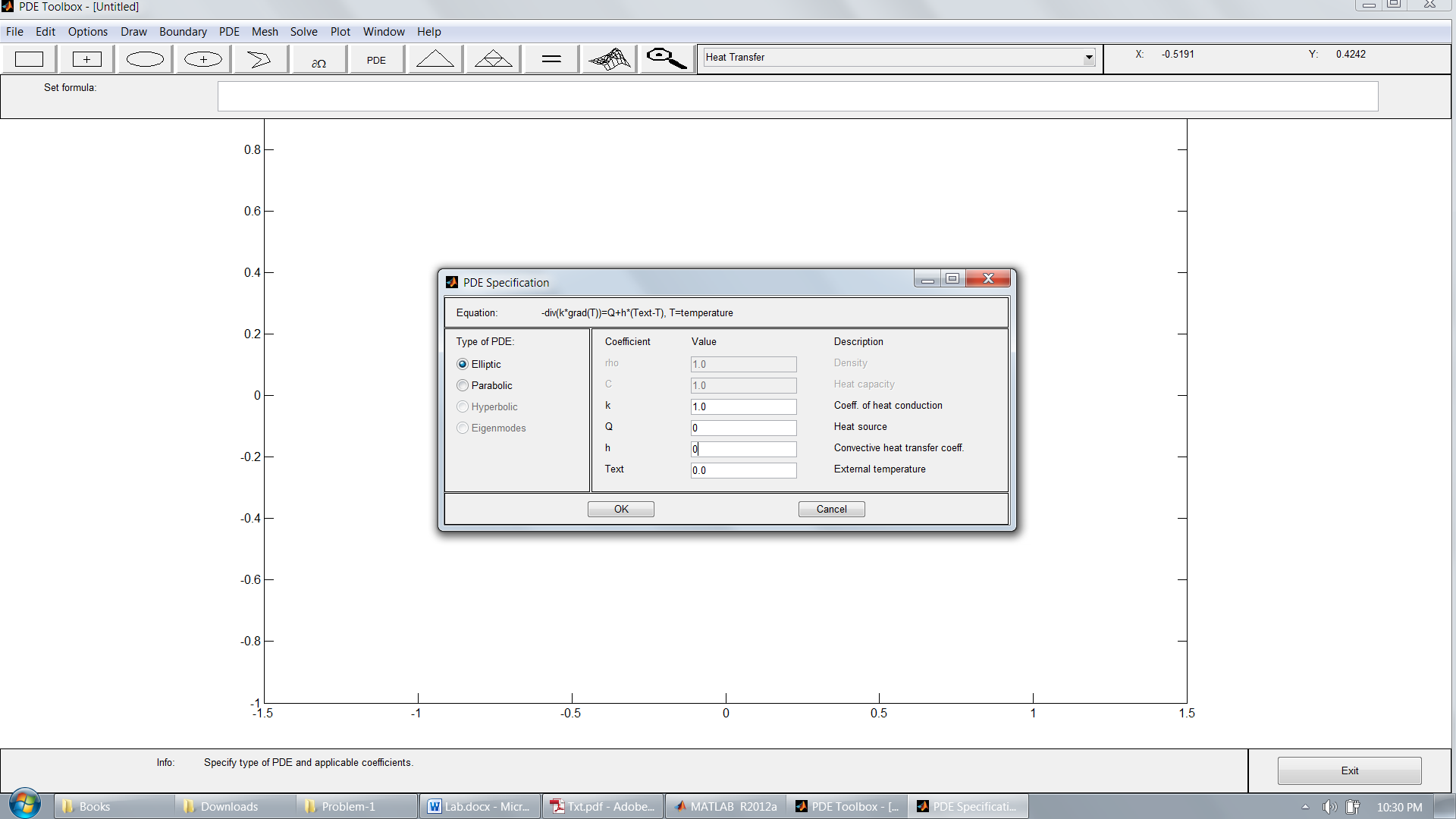


1. **Set the spatial limits for your problem:**

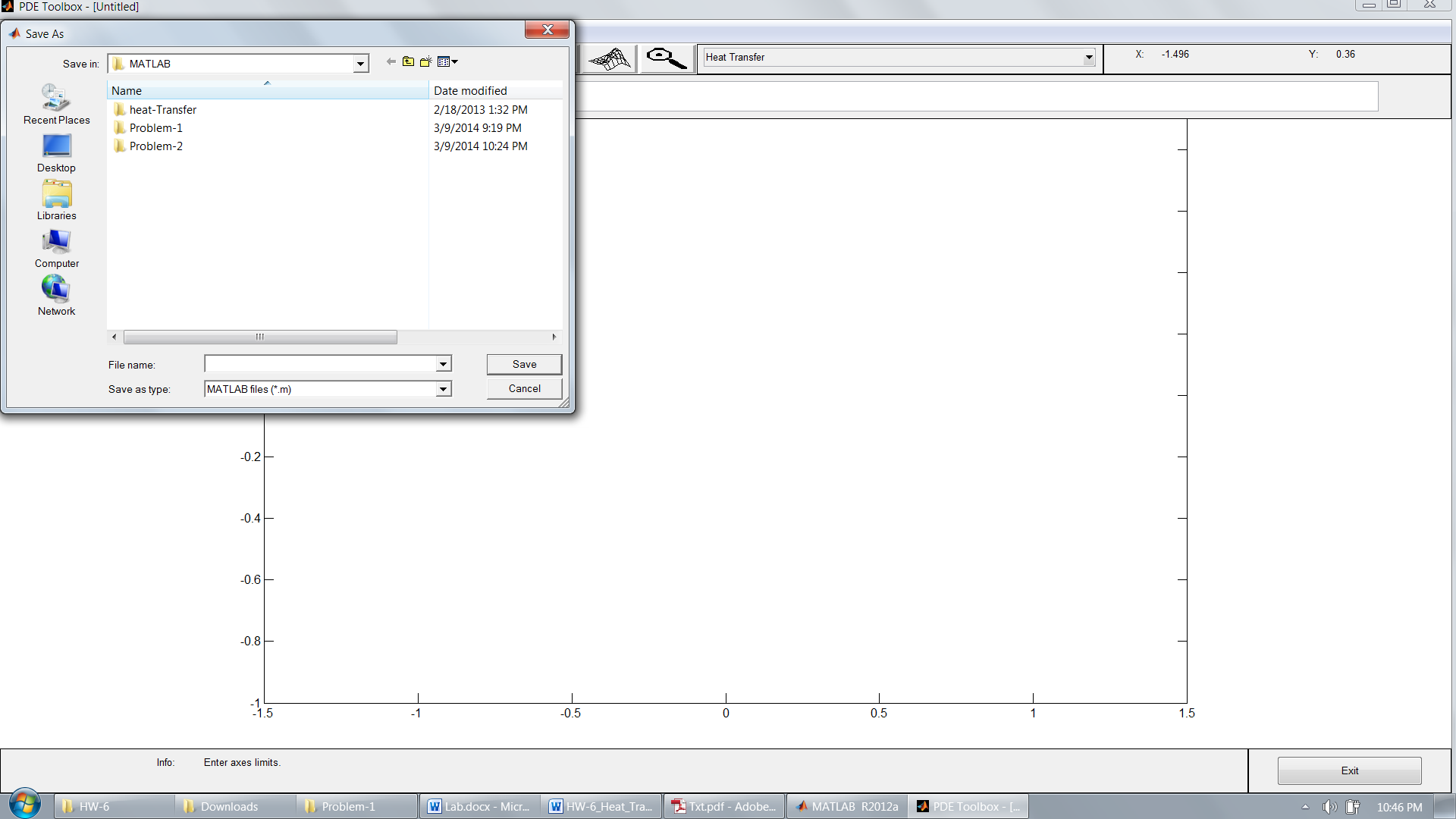
|  |  |
| --- | --- |
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**You may want to turn on ‘Grid’ and ‘Snap’ to make drawing shapes easier**

1. **Draw your shape using the “Draw” tools. You have rectangular and circular 2D geometries, and you can add/subtract shapes from one another. For other geometries you should use the polygon option**
2. **Once the 2D geometer is complete you need to assign boundary conditions to each surface. Use the ‘Boundary’ tab.** 
   1. In ‘Boundary Mode’ you can double-click on each boundary to specify the BC.
   2. Neumann boundaries are those with known heat flux
      1. g is your known heat flux at that boundary
      2. q is like a weighting factor for heat flux at that boundary (leave as 0)
   3. Dirichlet boundaries are those with known temperature
      1. r is your temperature
      2. h is a weighting factor at the boundary (leave as 1)
3. **After setting up the BC’s go under the ‘PDE’ menu and select ‘PDE Specifications’** 
   1. This is where you will specify the form of PDE
      1. Elliptic for SS-2D problems
      2. Parabolic for transient problems
   2. You will also specify terms for thermal conductivity (k), and volumetric heat generation (Q).
   3. You can also specify an external temperature and convection heat transfer coefficient around the entire object here.



1. **Create the mesh for your shape. Under the ‘Mesh’ menu select ‘Mesh Mode’ and a default mesh should show up.** 
   1. For a finer mesh use the ‘Refine Mesh’.
   2. If you have mesh problems you can ‘Jiggle Mesh’ to reshape it a little.
2. **When ready under ‘Solve’ select ‘Solve PDE’ and you should get a pretty picture.**
3. **To adjust your picture use the ‘Plot’ menu and select ‘Parameters…’**
   1. Play with the various options for gradients, isotherms, heat flow arrows, and such.
   2. Change colors, the number of contours, and other parameters until you get a picture you’re happy with.
4. **Once you have solved the problem please save it to a location that you can access even after you have logged off.**



1. **When you’re ready to turn you problem in, print a PDF from MATLAB.**

