Antenna Design With HFSS   Department of Engineering

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Worksheet 02 - Meshing

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Worksheet: viewing the mesh structures

All antenna radiation fields can be derived numerically using finite element analysis. In finite element analysis, a structure is broken down into small elements. The effect from each of the element is analyzed separately, and later integrated to get the total radiation pattern.

Breaking down a large structure into small elements is known as meshing. Smaller the size of each mesh element, more accurate the results.

Objectives:

In this session, you will

1. Plot meshes
2. Change mesh size
1. Observe the effect of different meshes on the computational time and results

 Step 1: open the monopole antenna project you created previously. In case you run into an error while opening it, use the helpful tip shown below.
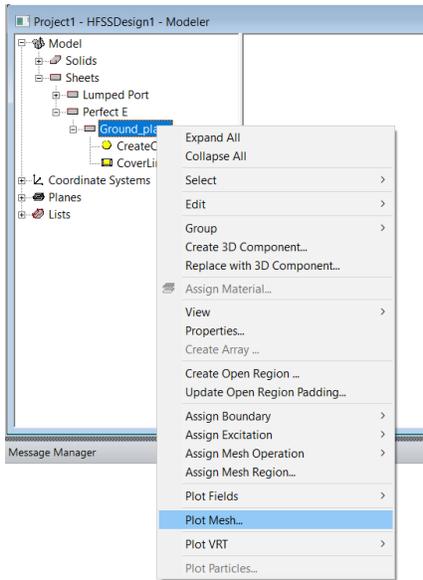
Helpful tip:

If your HFSS model crashes during runtime, you may see the following error while reopening it.
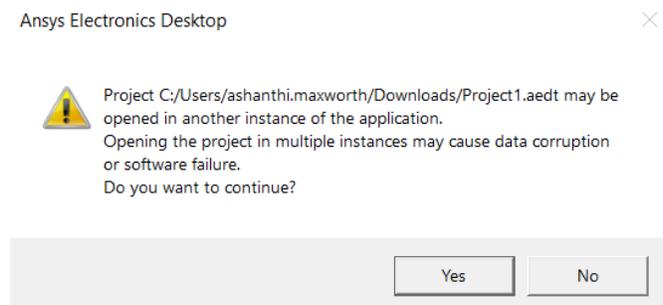
If so hit yes, and select the second option from the next pop-up window. Then hit open.
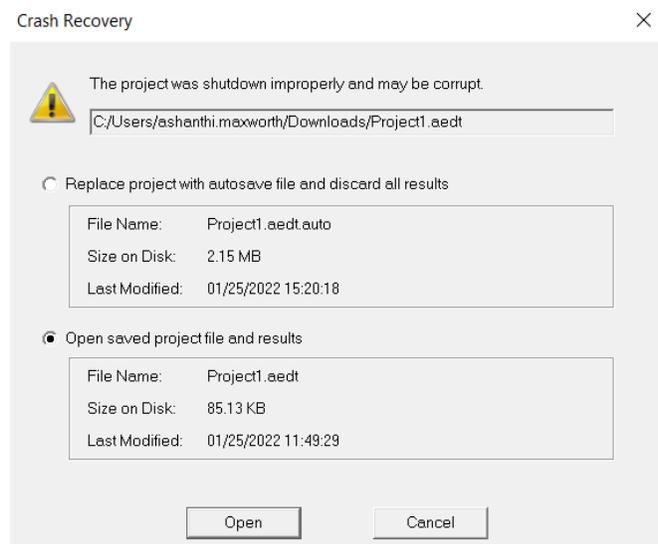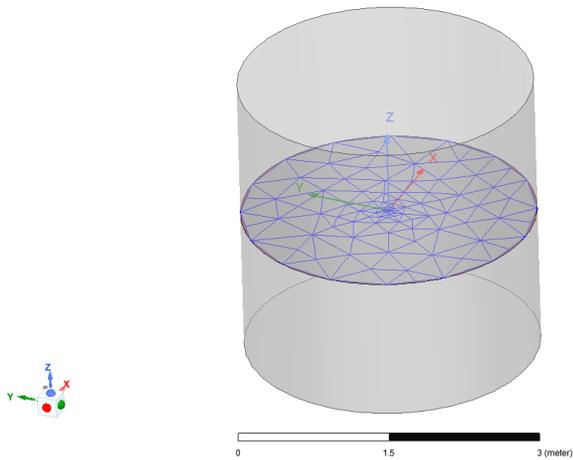
Step 2: go to the model pane, right click on the ground plane, and then go to plot mesh.
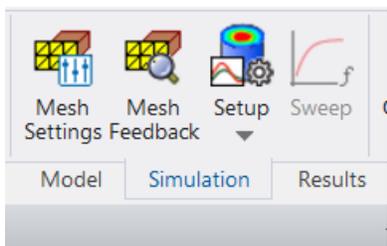

Step 3: leave the default names for the mesh parameters in the next pop-up window and hit OK.
Step 4: this will show the mesh for the ground plane. Rotate the figure to observe the mesh.

Step 5: Now go to the simulation tab ->mesh settings

Step 6: in the next pop-up window change the mesh size to coarse (level 2) by moving the slider. Then hit OK.

Step 7: go to the simulation tab ->validate (green check mark)

Step 8: got to simulation tab - > analyze all. With a coarse mesh the analysis process will be faster than before.

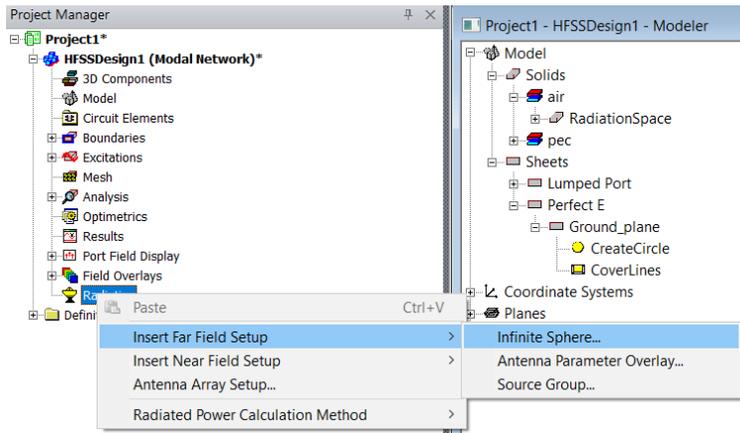Step 9: you will see the following coarse mesh for the ground plane.
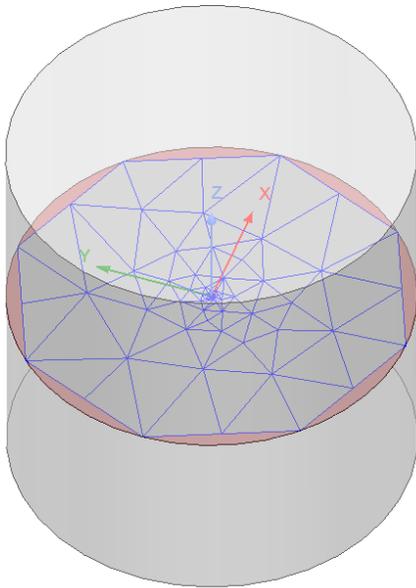
Important note:

For fine meshes, this process will take longer. The following image shows the ground plane with a finer mesh. Reducing the mesh size might not be possible in the student version.
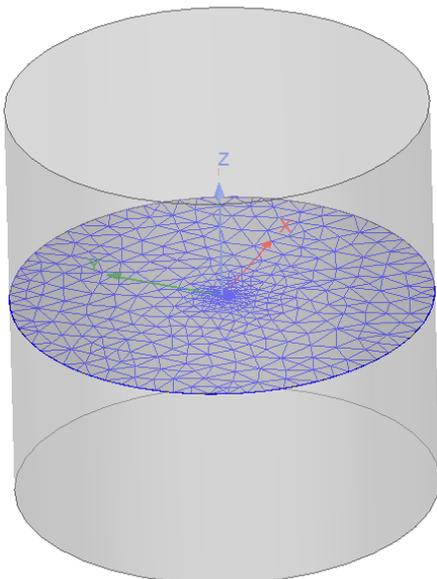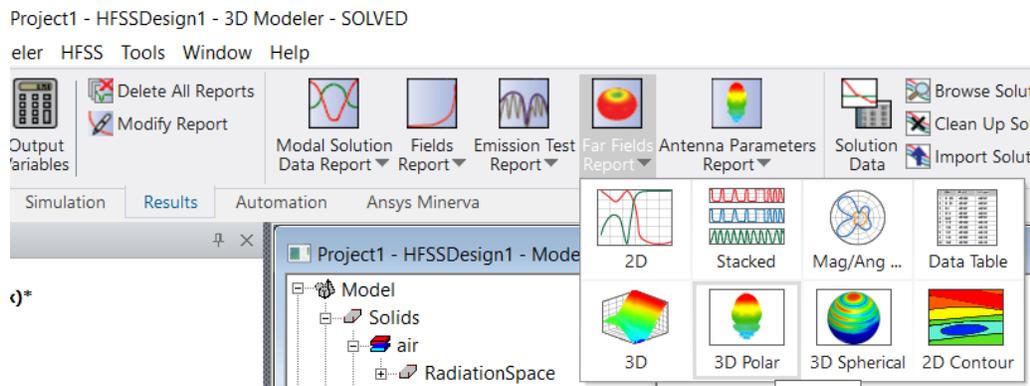
Step 10: Now go to the project manager tab, right click on radiation->insert far field set up->infinite sphere.

Step 11: leave the default settings in the next pop-up window and hit OK.

Step 12: Go to the results tab and from the far field reports drop down menu select 3D polar.

Step 13: generate three reports by selecting the following parameters from the pop-up parameter window. (rE: radiated electric field)

Left column	middle column	right column
rE	rE Total	mag
rE	rETheta	mag
rE	rEPhi	mag

Step 14: attach screen captures of the above three radiation patterns and upload to the learning management system as a single file.