

Upgrading to HFSS v9: Tips and Tricks

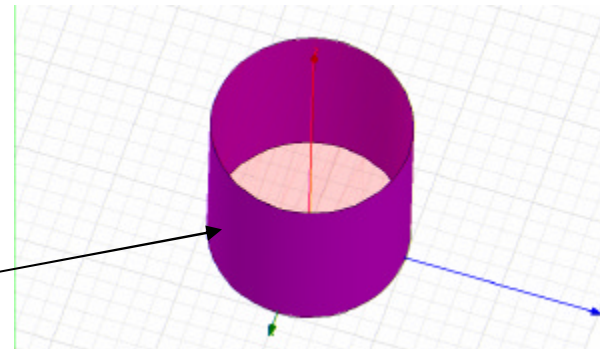
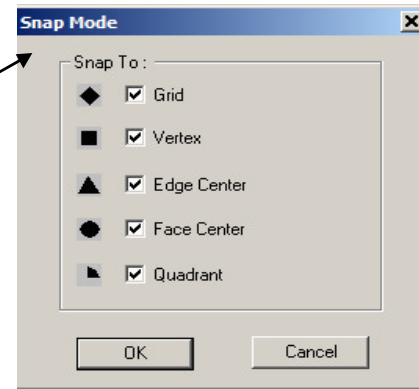
Dr. John Silvestro



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Modeler

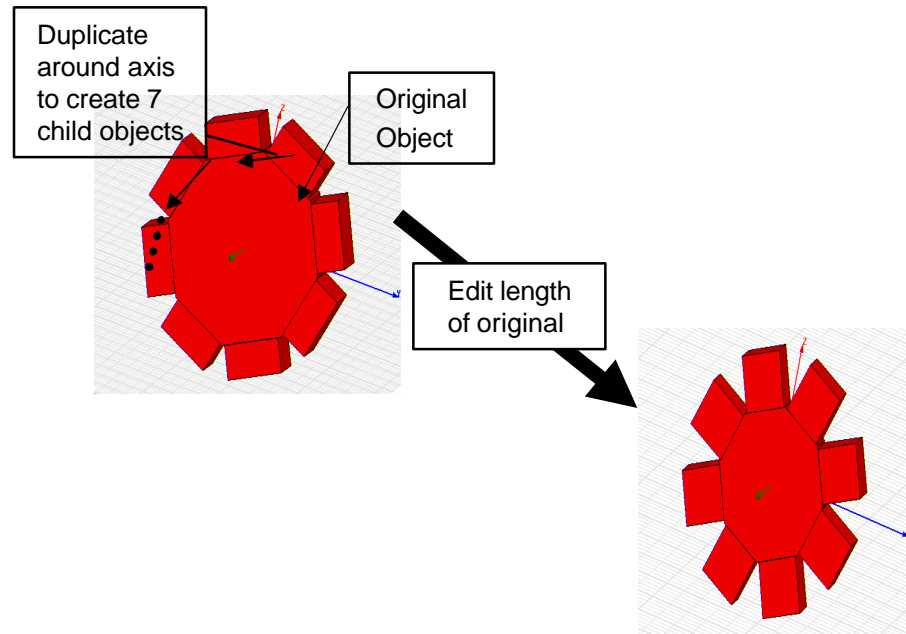
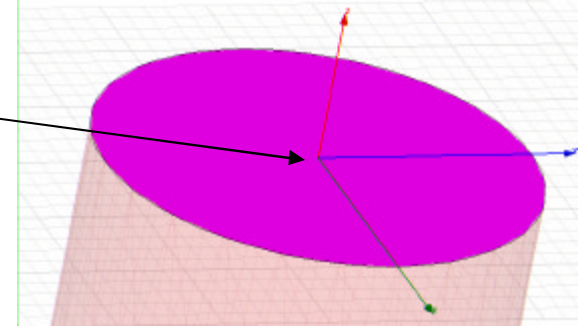
- ▶ Improved Snapping and selection
 - ▶ Cursor changes shape depending on where it is on a given object
- ▶ Next behind hotkey is now “b”- it works with faces or objects.
- ▶ **Ctrl** for multi-selection.
- ▶ **Alt** replaces **Ctrl** for rotate
- ▶ **Ctrl+d** for fit all views
- ▶ **Shift+F1** – context sensitive help
- ▶ All circles and cylinders are true surface by default.



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Part Dependency

- ▶ **Face Coordinate system** ties the coordinates to the face of an existing object.
- ▶ Child objects are created by using duplicate command (duplicate along line, mirror, around axis)
 - ▶ Child objects will have all properties of parent object
 - ▶ Material Property, Color, transparency, Size
 - ▶ If option is set, Child will have Boundary Conditions of parent object
 - ▶ Modifying parent's history will modify the child.
 - ▶ Modifying parent's color/material properties will not affect child's properties
 - ▶ **Note:** using copy and paste does NOT create a dependent (child) object. The 2 are independent.



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Duplicating Boundaries

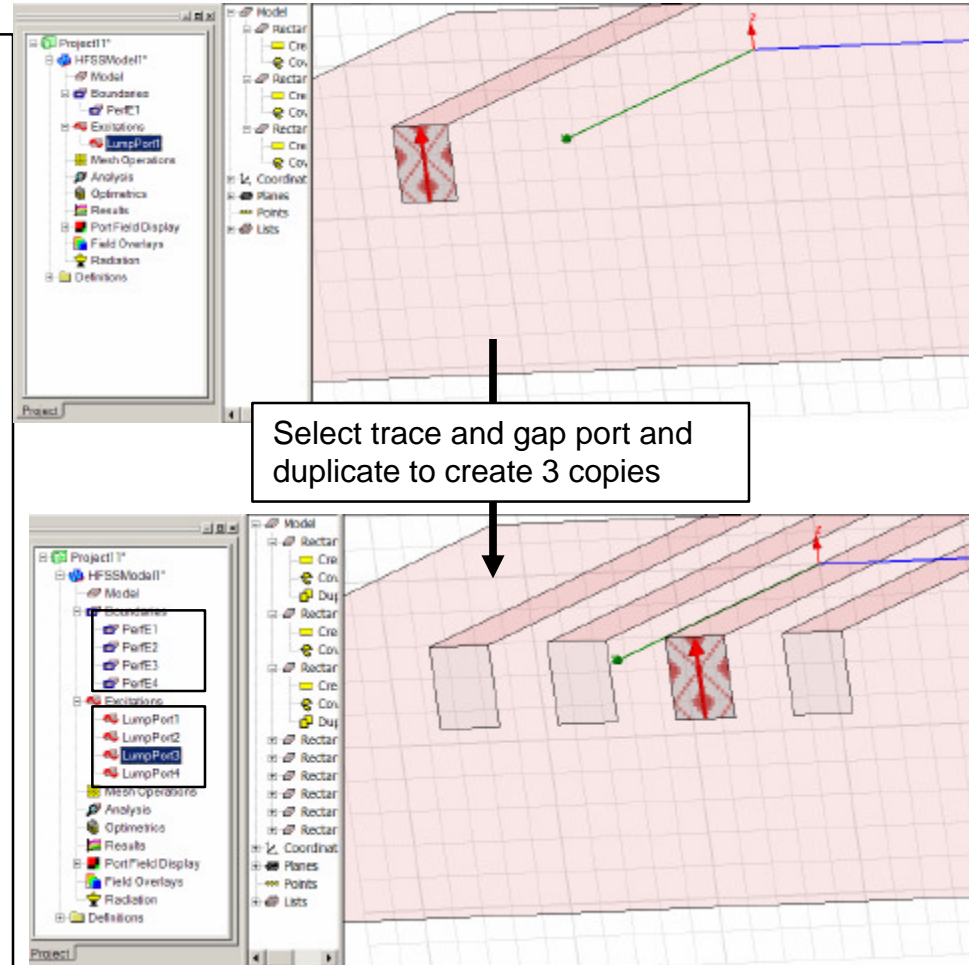
If you set the option

Duplicate boundaries with geometry

under

Tools>Options>HFSS options...

All boundary and excitations defined on a given object will be copied whenever the object is copied or duplicated.



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Solution Type and Port Enhancements

Solution Type

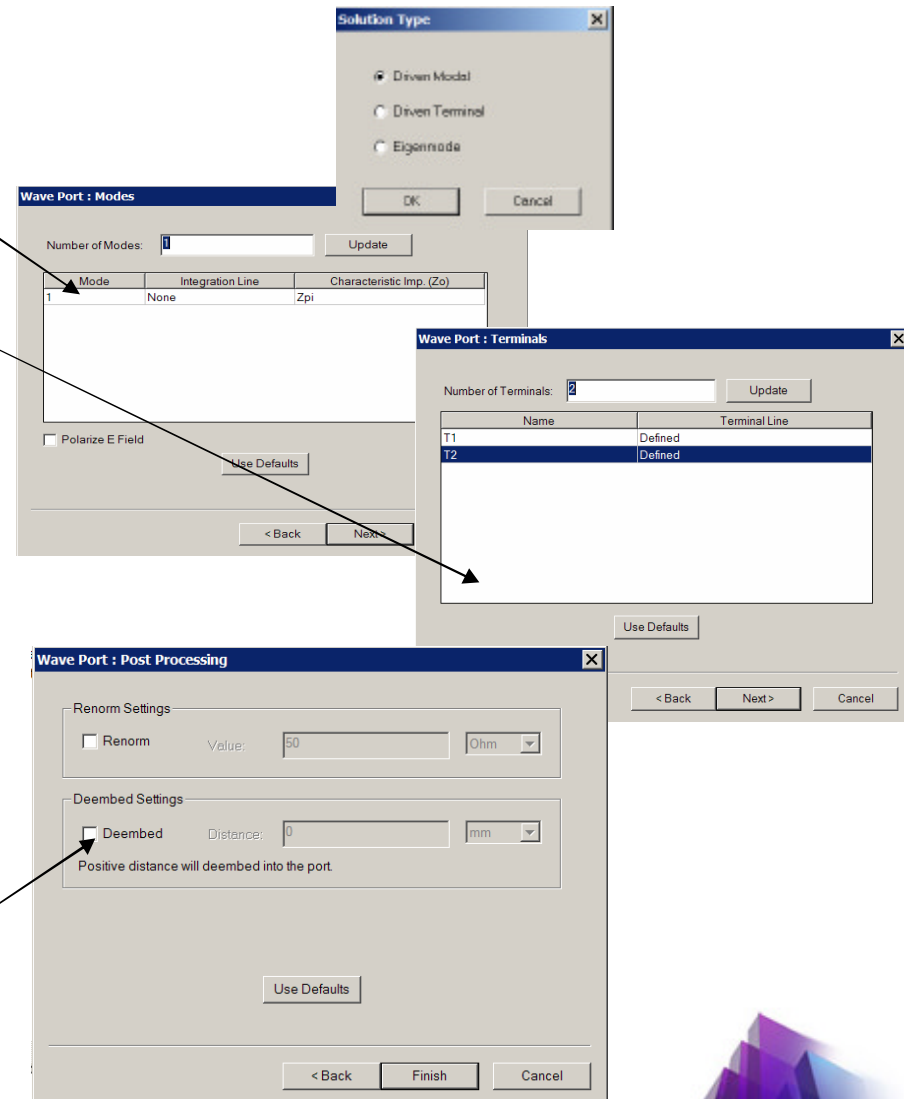
- ▶ **HFSS>Solution Type...** now has 3 choices.
 1. **Driven Modal** - V8* driven solution without terminals defined.
 2. **Driven Terminal** - V8* driven solution with terminals defined, except now the terminal scattering matrix will be computed directly. (**Hint:** for equally spaced and equal length terminal lines you can draw in the first line and duplicate it to create the others – just click on the word **Defined** for the first terminal line and go to **Duplicate...**)
 3. **Eigenmode** - unchanged.

- ▶ **Advantage:** The convergence criteria (?S) is now based on the desired [S].

- ▶ **Note:** Once you solve in a given solution type you can not change the type to view the other results without resolving.


Other Port Setup Changes

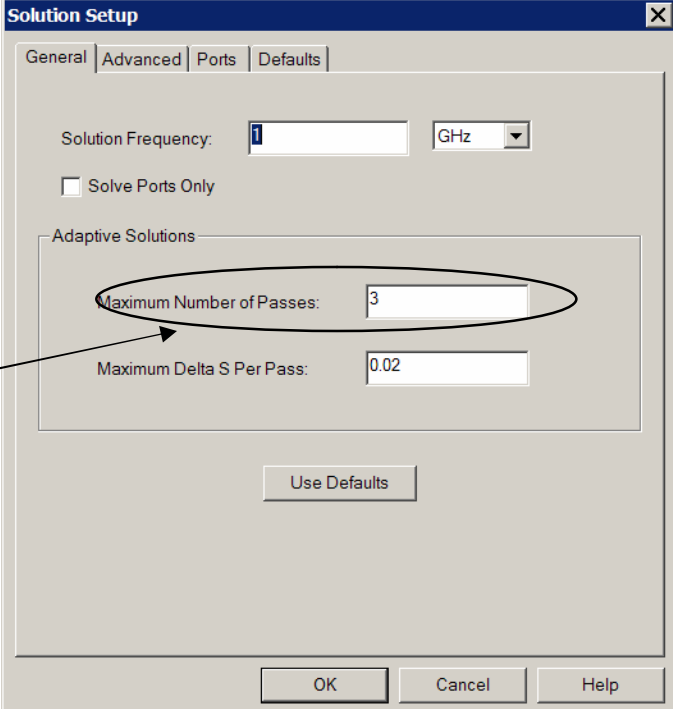
- ▶ In the last panel of a port definition is the **Post Processing** window. Here you can instruct HFSS to deembed and/or renormalize the [S]. Again this is the [S] that will be used in determining ?S.



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Solution Setup

- ▶ Before solving verify setup using  and verify boundary condition under **HFSS>Boundary Display (Solver view)**
- ▶ Add a solution setup and enter the setup info in the **General Tab**.
 - ▶ Notice you are entering the **Maximum Number of Passes**. In V8* you entered the number of **Requested Passes**.
 - ▶ On the Advanced tab you can also set the **Minimum Number of Passes** and **Minimum Converged Passes**. The latter sets the stop criteria at the number of consecutive passes with a ?S below the entered ?S.



Solution Setup

General | Advanced | Ports | Defaults

Solution Frequency: 1 GHz

Solve Ports Only

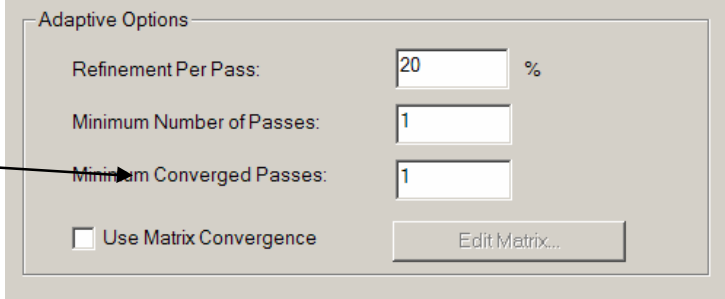
Adaptive Solutions

Maximum Number of Passes: 3

Maximum Delta S Per Pass: 0.02

Use Defaults

OK Cancel Help



Adaptive Options

Refinement Per Pass: 20 %

Minimum Number of Passes: 1

Minimum Converged Passes: 1

Use Matrix Convergence

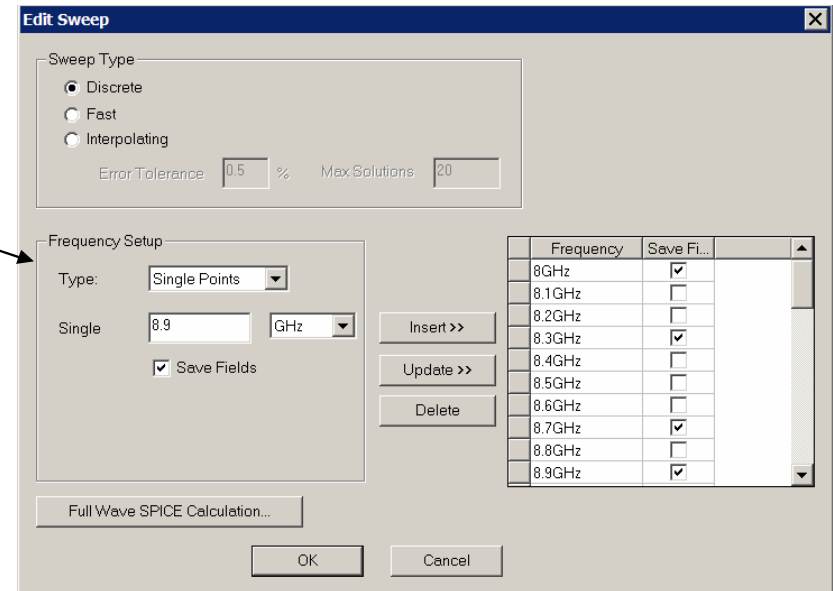
Edit Matrix...

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Sweep Setup

Once you have defined a solution setup you can add a sweep(s). Right mouse click on the Setup and **Add sweep...**

- ▶ Note: you can save the field solutions for all or part of a Discrete sweep and you have the option to not save the field solution for a Fast sweep.
- ▶ There is no option to save fields for Interpolating Sweep.

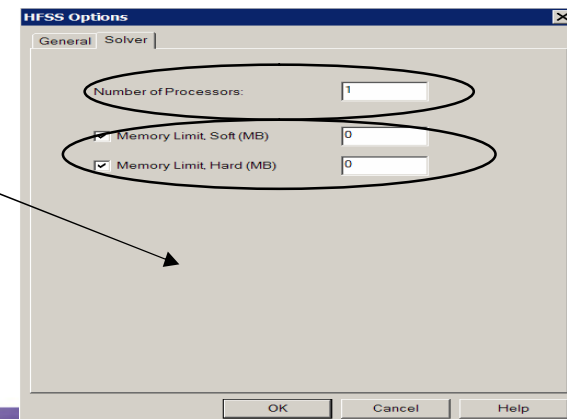
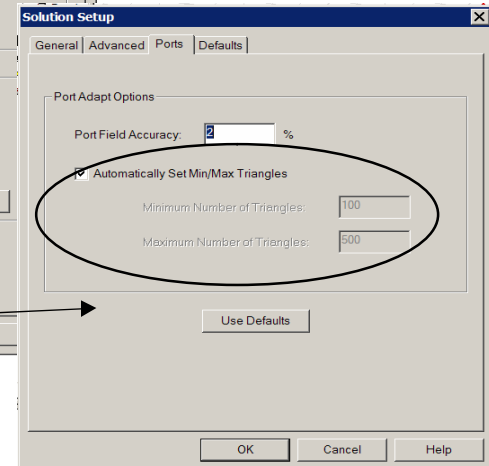
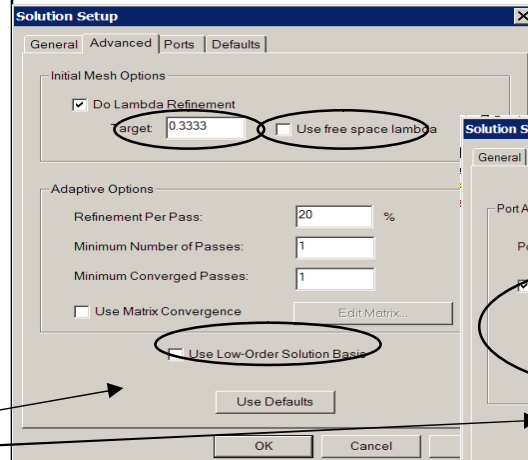


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Environment Variables

The important environment variables and prefs needed in V8* solutions are now available in the interface.

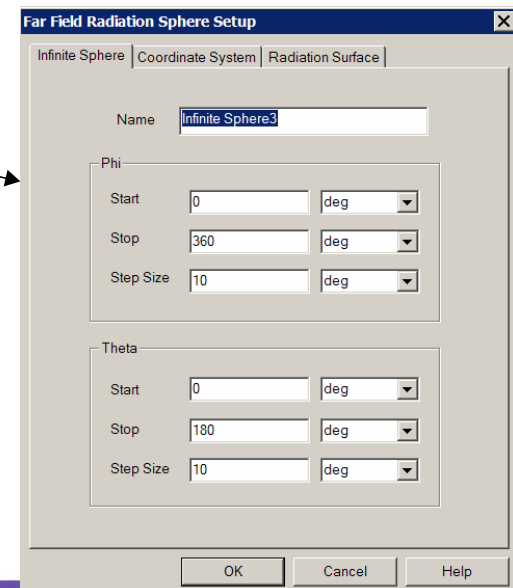
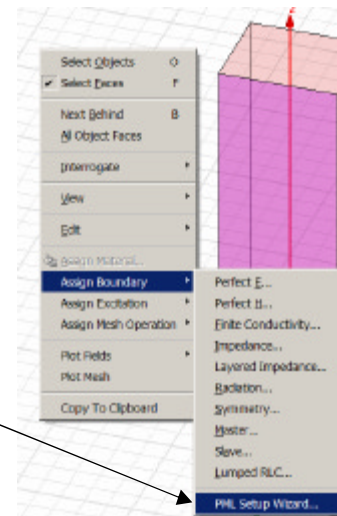
- ▶ The **Advanced** and **Ports** tab under **Solution Setup**
- ▶ Under **Tools>Options>HFSS options...** you can set solver prefs



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Antennas

- ▶ PML now defined same as any other boundary
- ▶ Before you can plot Near or Far field data you must define the setup:
 - ▶ Right mouse click on **Radiation** in tree and select **Insert Far field Setup>Infinite sphere...** (or **Insert Near Field Setup**). Enter pattern data
 - ▶ Note on the remaining tabs you can select a different coordinate system and/or a custom radiation surfaces.
- ▶ Then use **Create report...** to generate the plot.



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Antenna post processing

Notes:

- Realized Gain has been added: gain normalized to input power.
- SAR is available for plotting. To set the SAR parameters use **HFSS>Fields>SAR settings...**
- For multi port devices you can edit the sources under **HFSS>Fields>Edit sources...**
- New interface for array factor.

