Automatically Refine Your Mesh Using H-adaptive Meshing

A properly refined mesh is critical to achieving an accurate and efficient finite element analysis with a converged solution*. Using Adaptive Meshing allows SOLIDWORKS to refine the mesh of parts and assemblies automatically until a desired accuracy is achieved. Follow these steps to use H-Adaptive meshing:

1. Run your study with the initial default mesh settings to check the study setup. (see [https://mlc-cad.com/solidworks-simulation-meshing-guide/](https://mlc-cad.com/solidworks-simulation-meshing-guide/) for general information about meshing)

2. Right-click the name of the study and select “Properties”

3. Select “h-adaptive” to automatically adjust the size of the 2nd-order mesh elements.

4. Adjust the Accuracy bias – Moving the slider to the left provides more accurate peak stress results, meaning the mesh will become more highly refined in the local areas with high strain energy errors. For models with stress singularities, move the slider to the right to get overall accurate results while ignoring high, but localized, strain energy errors.

5. Adjust the Target accuracy – This is the accuracy of the strain energy norm in the model. Set at 98%, for example, the looping will stop if the difference in the strain energy norm between two consecutive loops drops below 2%.

6. Set the Maximum no. of loops – This sets how many times the mesh will be refined in an attempt to reach the target accuracy. "5" is the maximum setting, but the study can simply be re-run repeatedly until the desired accuracy level is achieved. (Looping will stop prior to the specified number of loops if target accuracy is achieved.)

7. Selecting “Mesh coarsening” allows the mesh elements to become larger in areas with low stress gradients

8. Note: Selecting “p-adaptive” would automatically adjust the polynomial order of the mesh element rather than its size.

9. Click “OK” and run the study.

10. If desired, create a convergence graph of the stress results by right-clicking the results folder and selecting “Define Adaptive Convergence Graph”. Under “options” clear “Target accuracy” and select “Maximum von Mises Stress”.

* A simulation study is considered “converged” when rerunning the study with a finer mesh does not significantly change the stress results in the area of interest.

Note: Adaptive solutions can lead to significantly longer solution times so adaptive meshing is best used in special cases where the solution requires a narrowly specified accuracy.