Midsurfacing: Introduction

• For many FE analyses, parts are represented by shell elements
  • Thickness is assigned mathematically, rather than geometrically
  • Mesh is usually placed on the midplane of the part

• CAD geometry usually comes as a solid part, or a series of surfaces defining a volume.

• Midsurfacing creates a layer of surfaces on the midplane which can be directly meshed
Midsurfacing: Tools

- Midsurfaces can be created using **midsurface panel** on the geom page
  - **Auto Midsurface** – Automatically extracts midsurfaces from surfaces that enclose a volume or a solid geometry
    - Can sometimes work if there are missing surfaces
    - The greater number of missing surfaces, the less reliable the result
  - **Surface Pair** – creates a midsurface between 2 selected surfaces
Midsurfacing: Tools

• Once a midsurface has been created, it can be modified using tools on the midsurface panel
  • **Quick Edit** – Repair a midsurface by correcting where the verticies of the surface were placed
  • **Assign Target** – An extension to quick edit, and functions in a similar fashion
  • **Replace Edge** – Fill in gaps and slivers by combining one surface edge with another
    • same as in the edge edit panel
  • **Extend Surface** – Extends two surfaces (e.g., ribs) until they intersect
  • **View Thickness** – Review of the thickness of a midsurface using white lines (probes) extending from each vertex of the surface
Midsurfacing: Process & Strategy

1. Obtain a closed volume of surfaces or solids
   • *Midsurface : auto midsurface* requires an enclosed volume
   • Use topology repair techniques if needed

2. For complex parts, try defeaturing the surface defining the volume
   • This simplifies the part and may give better results with *create : solid*

3. Generate the midsurface using *midsurface : auto midsurface*
   • Use *surface pair* for areas that need more control
   • Use *midsurface : editing tools* for midsurfaces that need fine tuning

4. View the midsurface and correct errors using the midsurface editing functionalities
   • Can generally use *quick edit*
### Midsurface r/t parameter exposed to allow control over the midsurface generation in areas with high radius-to-thickness ratios

**9.0** - r/t parameter was hard-coded to 2.0

**10.0** - r/t parameter is user-defined with default of 2.0