



Altair

HyperWorks

HM-3120: 2-D Mesh in Curved Surfaces

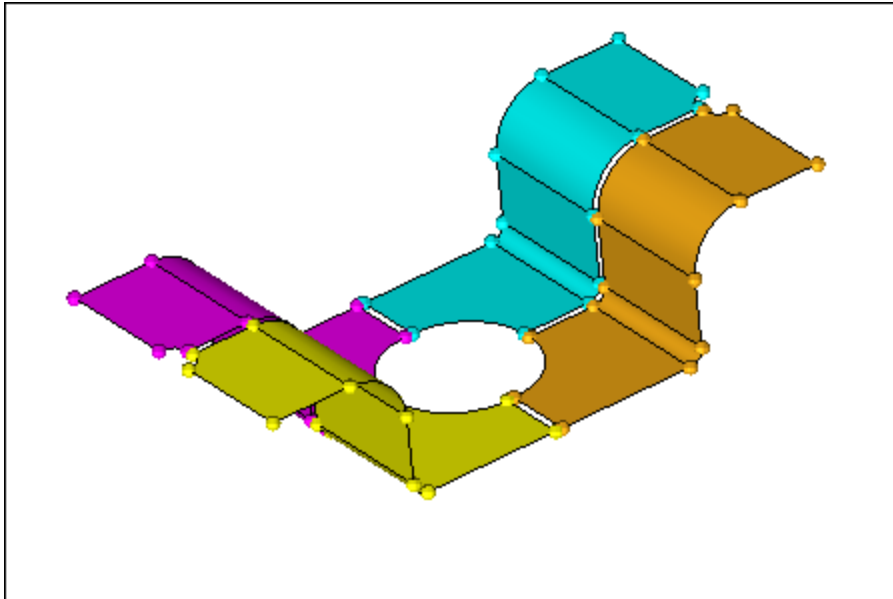
In this tutorial, you will learn how to:

- Create a mesh based only on element size
- Mesh a set of surfaces using the maximum deviation parameter
- Reduce the maximum angle perimeter
- Increase the maximum element size parameter

Chordal deviation is a meshing algorithm that allows HyperMesh to automatically vary node densities and biasing along curved surface edges to gain a more accurate representation of the surface being meshed.

Model Files

This exercise uses the `chordal_dev.hm` file, which can be found in the `hm.zip` file. Copy the file(s) from this directory to your working directory.



Exercise: Controlling the 2-D Mesh Concentration in Curved Areas

Step 1: Open the model file, `chordal_dev.hm`.

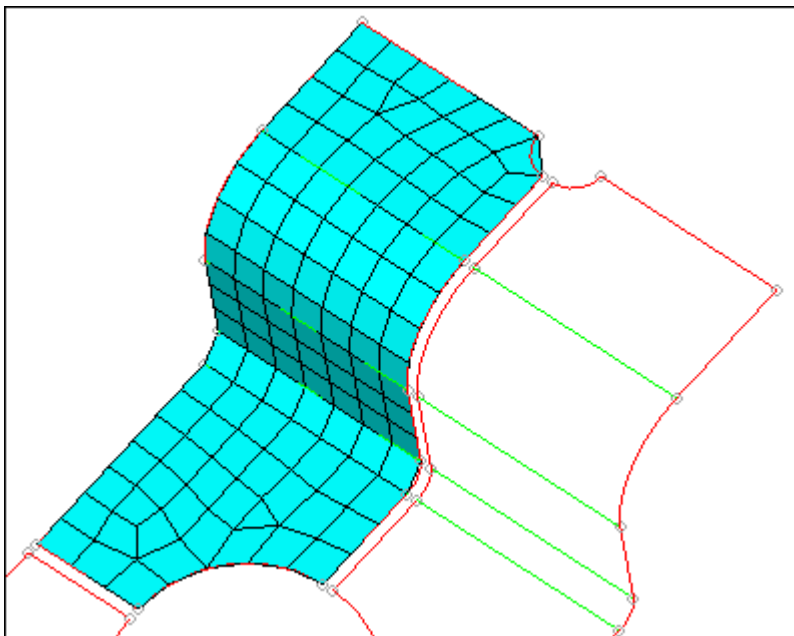
1. Start HyperMesh Desktop.
2. From the menu bar, click **File > Open > Model**.
3. In the **Open Model** dialog, open the `chordal_dev.hm` model file.

4. Observe the model using the different visual options available in HyperMesh (rotation, zooming, etc.).

Step 2: Set the mesh parameters and create the mesh.

In this step, you will create a mesh using only element size, not the chordal deviation meshing parameters.

1. To open the **Mesh** panel, click **Mesh > Create > 2D AutoMesh** from the menu bar, or select **automesh** from the 2D page.
2. Toggle the mesh mode from **interactive** to **automatic**.
3. In the **element size =** field, enter 15.000.
4. Set the **mesh type** to **quads**.
5. Set the toggle to **elems to surf comp**.
6. Select **surfs >> by collector >> use size**.
7. Click **select**.
8. Click **mesh**. HyperMesh creates the mesh.



View of the completed mesh for this step.

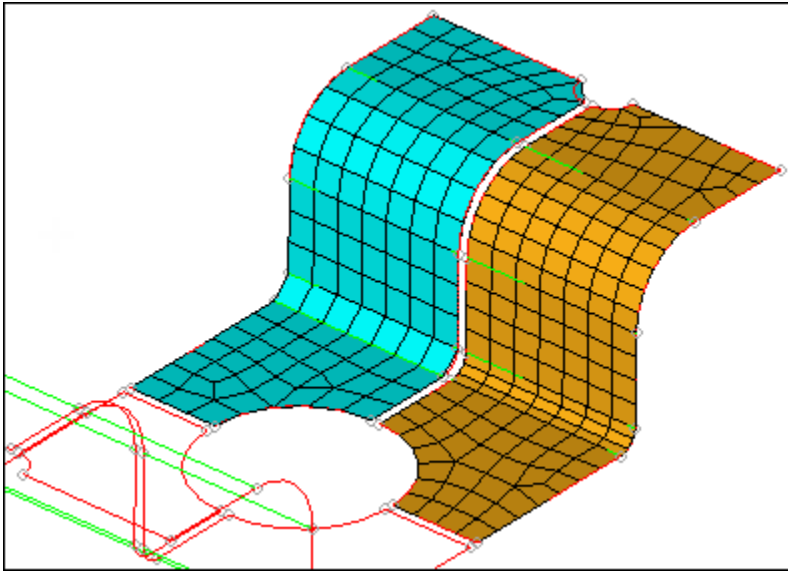
Step 3: Set the chordal deviation parameters and create the mesh.

In this step, you will mesh a set of surfaces using the maximum deviation parameter to control the element densities and biasing.

1. Go to the **edge deviation** subpanel.
2. In the **min elem size =** field, enter 1.000.

Tip: To cycle through the parameter settings, press TAB after typing in a value.

3. In the **max elem size =** field, enter 15.000.
4. In the **max deviation =** field, enter 0.500.
5. In the **max angle =** field, enter 90.000 for the maximum angle parameter to be neglected.
6. Set the **mesh type** to **quads**.
7. Select **surfs >> by collector >> deviation ctrl.**
8. Click **select**.
9. Click **mesh**. HyperMesh create the mesh.



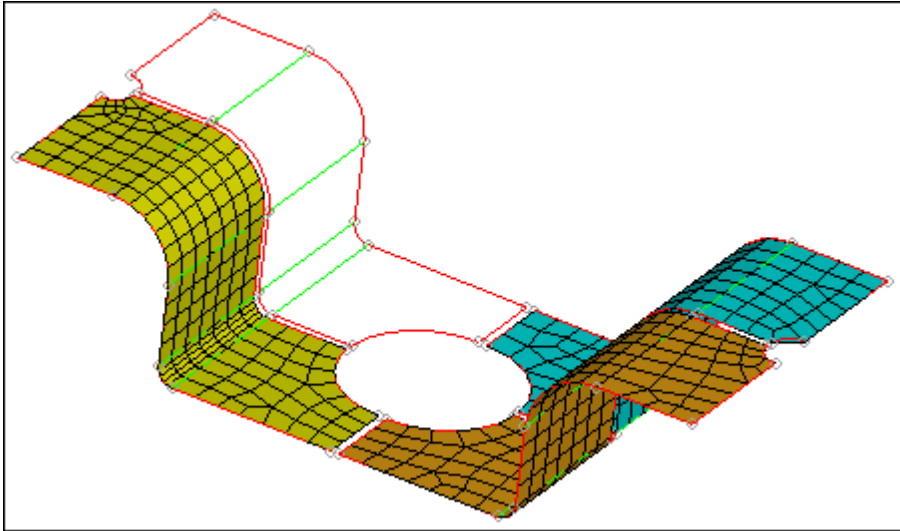
View of the completed mesh for this step.

Step 4: Set the chordal deviation parameters and create the mesh.

In this step, you will use the same chordal deviation settings from the previous step, but reduce the maximum angle parameter to compare the effects.

1. In the **max angle =** field, enter 20.000.
2. Select **surfs >> by collector >> angle ctrl.**
3. Click **select**.

4. Click **mesh**. HyperMesh creates the mesh on the surfaces.

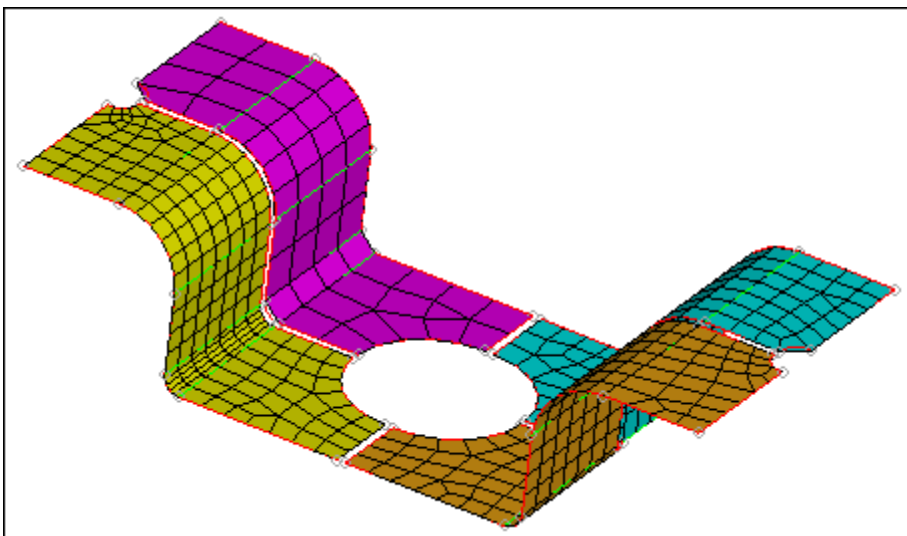


View of the completed mesh for this step.

Step 5: Set the chordal deviation parameters and create the mesh.

In this step, you will use the same chordal deviation parameters from the previous step except for the maximum element size parameter. The maximum element size parameter is increased to allow the algorithm to create larger and fewer elements along planer and less curved surface edges.

1. In the **max elem size =** field, enter 30.000.
2. Select **surfs >> by collector >> max size ctrl**.
3. Click **select**.
4. Click **mesh**. HyperMesh creates the mesh.



View of the completed mesh for this exercise.