Altair

HyperWorks

Altair HyperMesh 2019 Tutorials

HM-3000: Creating 1-D Elements

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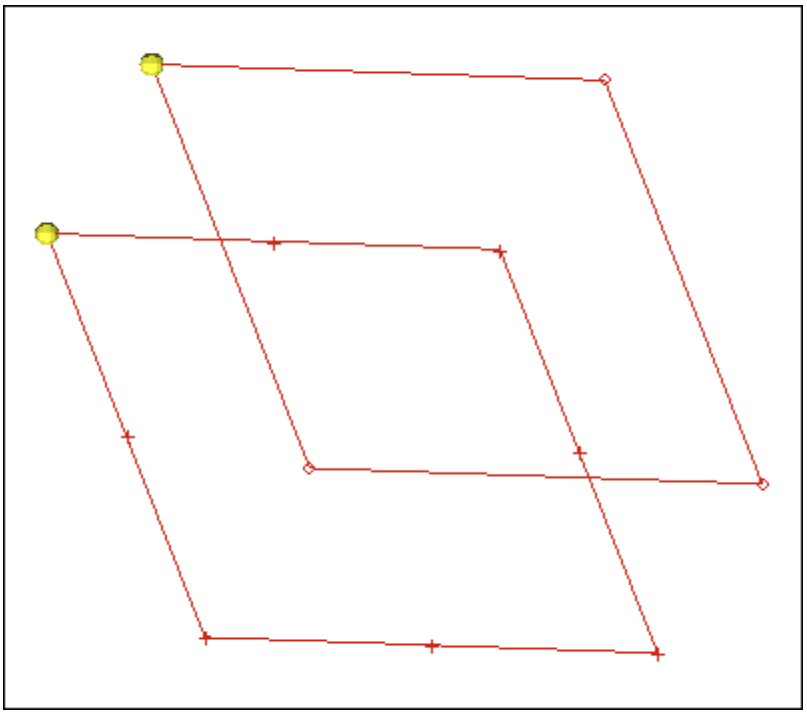
In this tutorial, you will learn how to build 1D elements.

Model Files

This exercise uses the `1d_elements.hm` file, which can be found in the `hm.zip` file. Copy the file(s) from this directory to your working directory.



Exercise: Creating 1-D Elements

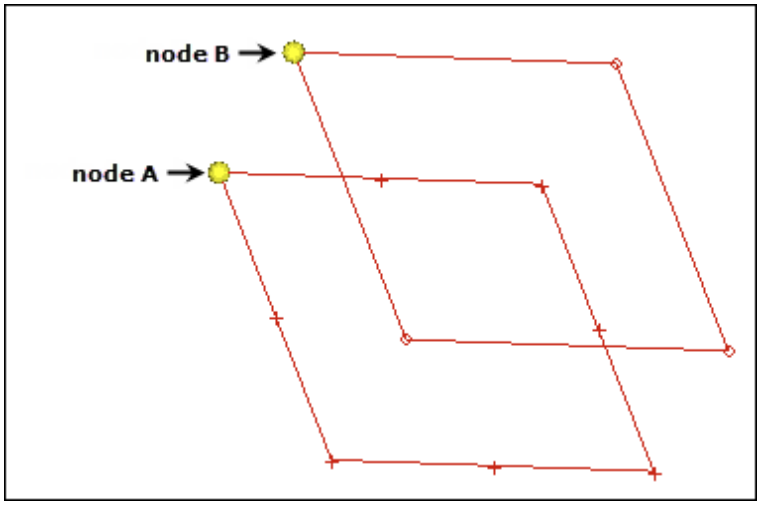
Step 1: Retrieve the model file.

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

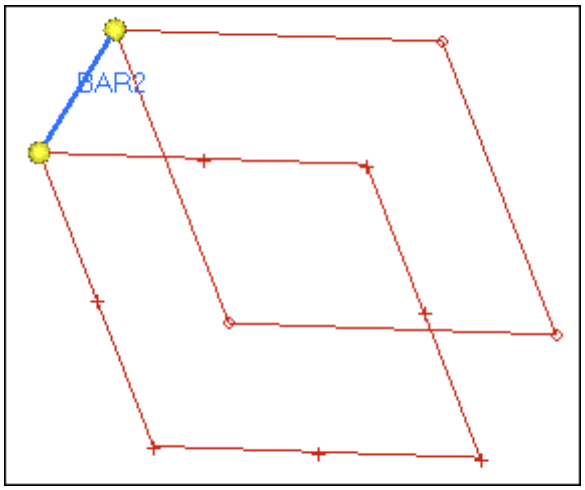
Step 2: Create 1-D bar elements.

1. Open the **Bars** panel by clicking ***Mesh*** > ***Create*** > ***1D Elements*** > ***Bars*** from the menu bar.
2. Go to the **bar2** subpanel.

3. In the **ax**, **ay**, and **az** fields, enter `0`. These are the values for the bar offset.
4. Click ***property =*** and select ***property1***. HyperMesh assigns a property to the element.
5. In the **pins a** and **pins b** fields, enter `0`. These are the values for the degrees of freedom.
6. Click the **orientation** switch and select **components**.
7. In the **x comp**, **y comp**, and **z comp** fields, enter `1`. These values define the local y-axis.
8. Activate the ***node A*** selector, and select the lower node indicated in the following image.



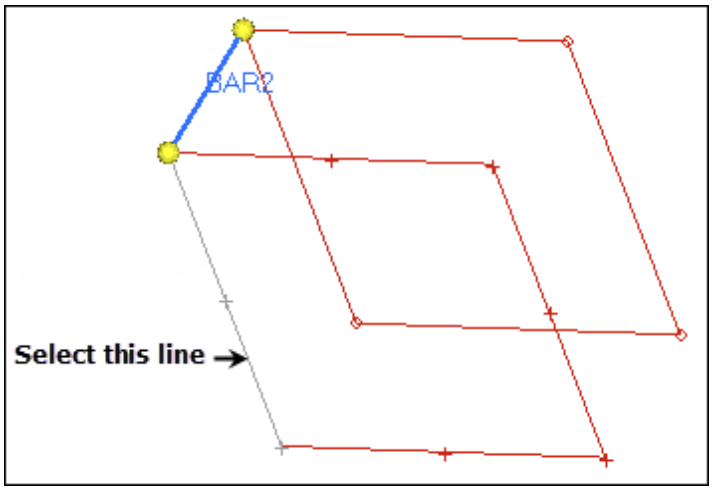
9. With the **node B** selector now active, select the upper node indicated in the previous image. HyperMesh creates the two-noded bar element.



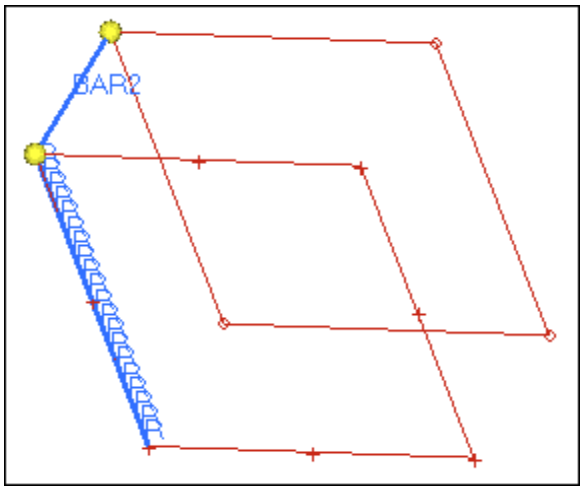
10. Exit the panel by clicking ***return***.

Step 3: Create 1-D elements along a line.

1. Open the **Line Mesh** panel by clicking ***Mesh*** > ***Create*** > ***Line Mesh*** from the menu bar.
2. Verify that the entity selector is set to ***lines***.
3. Select the line indicated in the following image.

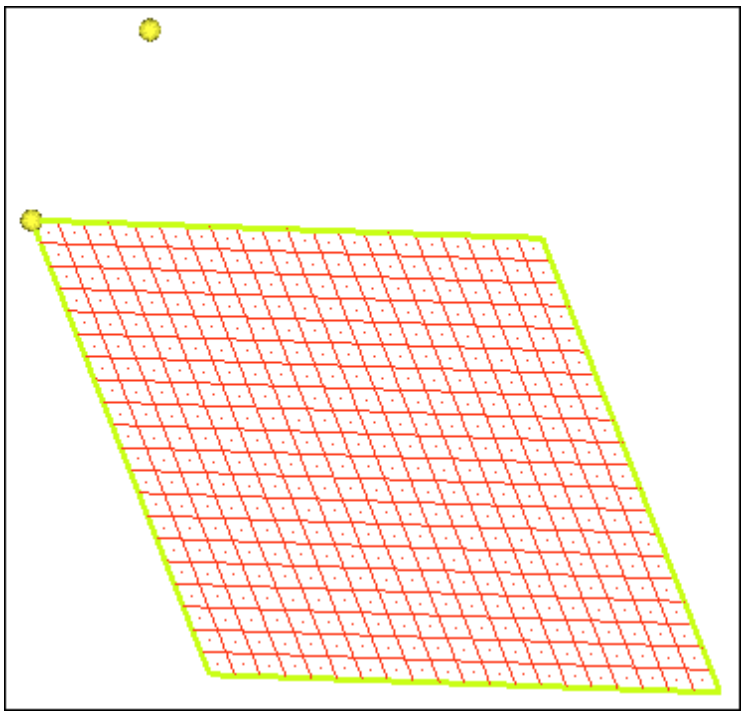


4. Verify that the toggle is set to **segment is whole line**.
5. From the **element config** list, select ***rigid***.
6. Click ***mesh***. The **Density** panel opens.
7. Activate the ***set segment*** selector.
8. In the **elem density =** field, enter `20`.
9. Click ***set all***. HyperMesh creates rigids on the selected line.
10. Go back to the main menu by clicking ***return*** twice.



Step 4: Create 1-D elements from the feature in the model.

1. In the **Model** browser, turn off the display of all of the geometry in the model.
2. Turn off the display of all of the elements in the model except for the elements in the **feature_elements** component.
3. Open the **Features** panel by clicking ***Mesh*** > ***Check*** > ***Components*** > ***Features*** from the menu bar.
4. Verify that the entity selector is set to ***comps***.
5. Click ***comps*** >> **feature_elements**.
6. Click ***select***.
7. In the **feature angle =** field, enter `30`.
8. Select the ***ignore normals*** check box.
9. Verify that the **create** toggle is set to ***plot elements***.
10. Click ***features***. HyperMesh creates the plot elements as green edge lines.



11. Exit the panel by clicking ***return***.