Large Telescope Truss - Numerical Solution

Author: Samuel Smith, Cornell University

Numerical Solution
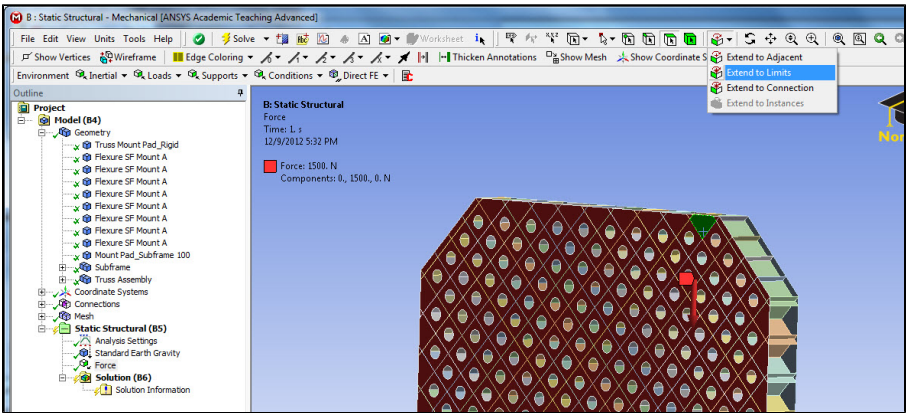
The Solution setup is fairly simple. We want to find the deformation of the face that is connected to the mirrors, specifically in the Z direction.

First, add in the standard Total Deformation and Equivalent Stress across the entire body. Right click on Solution, Insert>Deformation>Total. Then, Right click on Solution, Insert>Stress>Equivalent (von-Mises).

Now we will add in the Directional deformation. Right click on Solution, Insert>Deformation>Directional. Change the direction to Z, and select the 280 faces using the method discussed before.

The next solutions that we want to concern ourselves with is creating joint probes to discover how the joints deform and move with the rest of the geometry.

Right Click on Solutions, Insert>Probe>Joint.

Under the boundary condition, select a defined joint.

Definition	
Type	Joint Probe
Boundary Condition	Fixed - Flexure SF Mount A-1 To... ▼
Orientation Method	Joint Reference System
Suppressed	No
Options	
Result Type	Total Force
Result Selection	All
Display Time	End Time
⊞ **Results**	
Maximum Value Over Time	
☐ X Axis	-0.3234 N
☐ Y Axis	-593.97 N
☐ Z Axis	30.732 N
☐ Total	594.77 N
Minimum Value Over Time	
☐ X Axis	-0.3234 N
☐ Y Axis	-593.97 N

Repeat this for each of the joint probes.

Go to Step 6: Numerical Results

Go to all ANSYS Learning Modules