

# Chapter 7

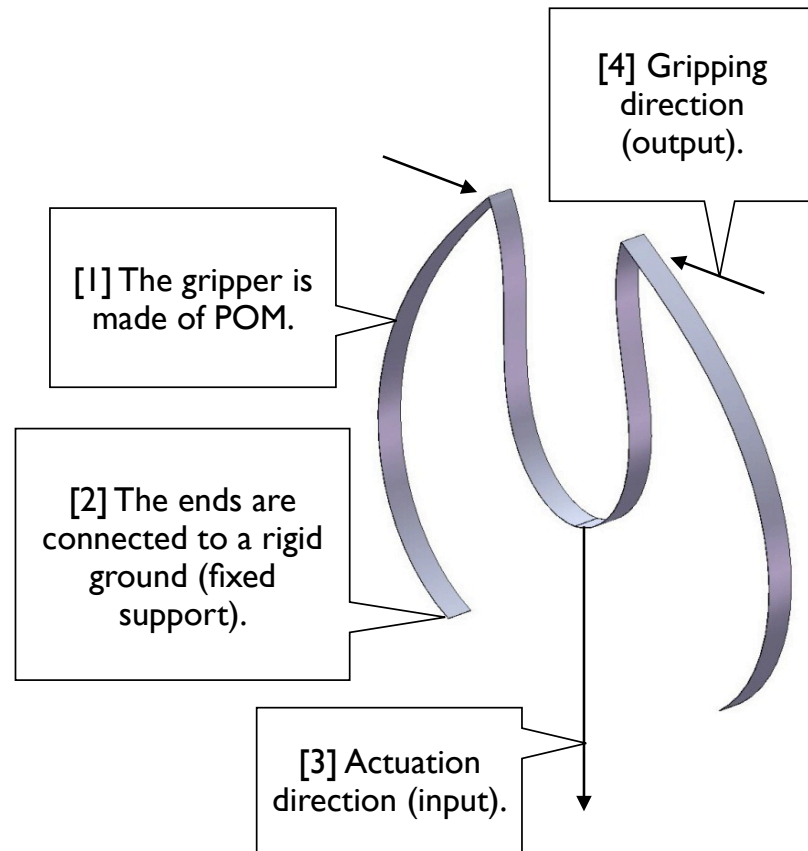
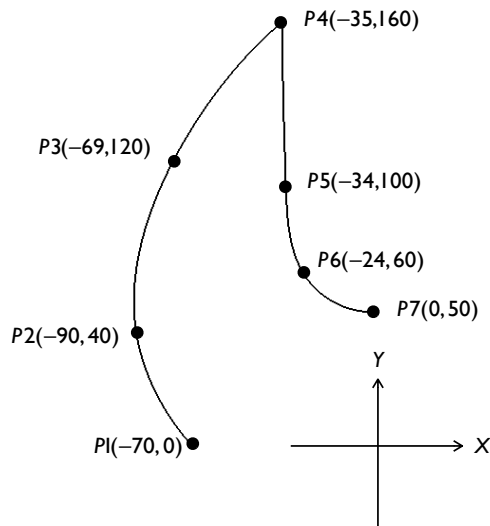
## Line Models

- 7.1 Flexible Gripper
- 7.2 3D Truss
- 7.3 Two-Story Building
- 7.4 Review

# Section 7.1

## Flexible Gripper

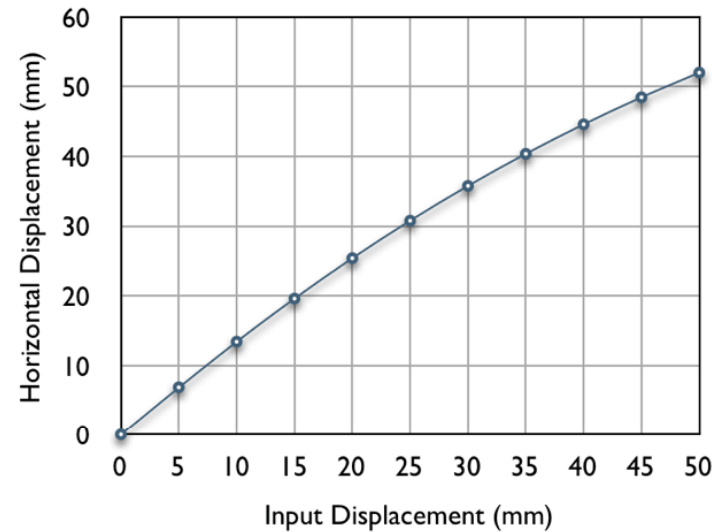
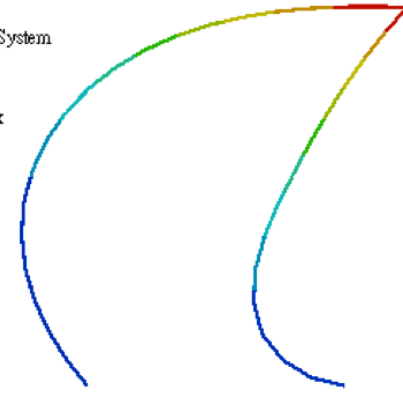
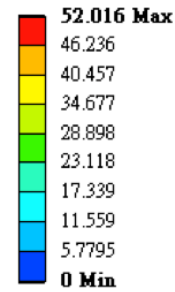
### Problem Description



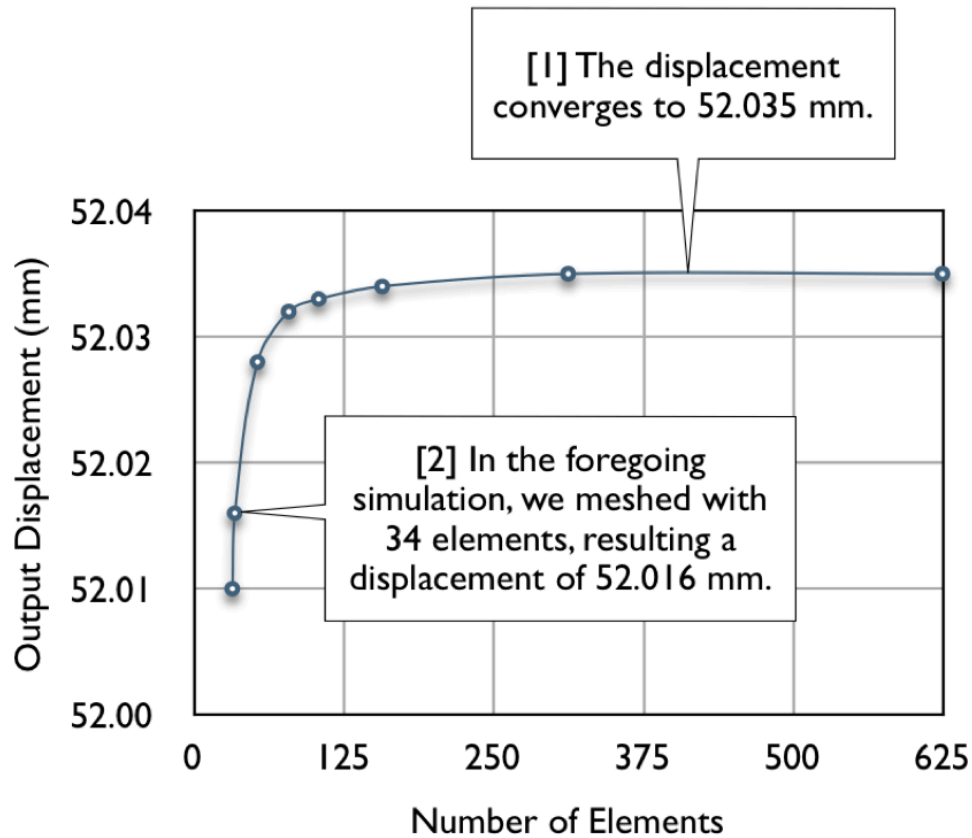
# Techniques/Concepts

- Line bodies
- Cross Sections
- Cross Section Alignments
- Cross Section Solids
- Beam Elements
- Symmetry Conditions
- Geometric Advantage

**A: Static Structural**  
 X Axis - Directional Deformation  
 Type: Directional Deformation(X Axis)  
 Unit: mm  
 Global Coordinate System  
 Time: 1.



# Convergence Study of Beam Elements



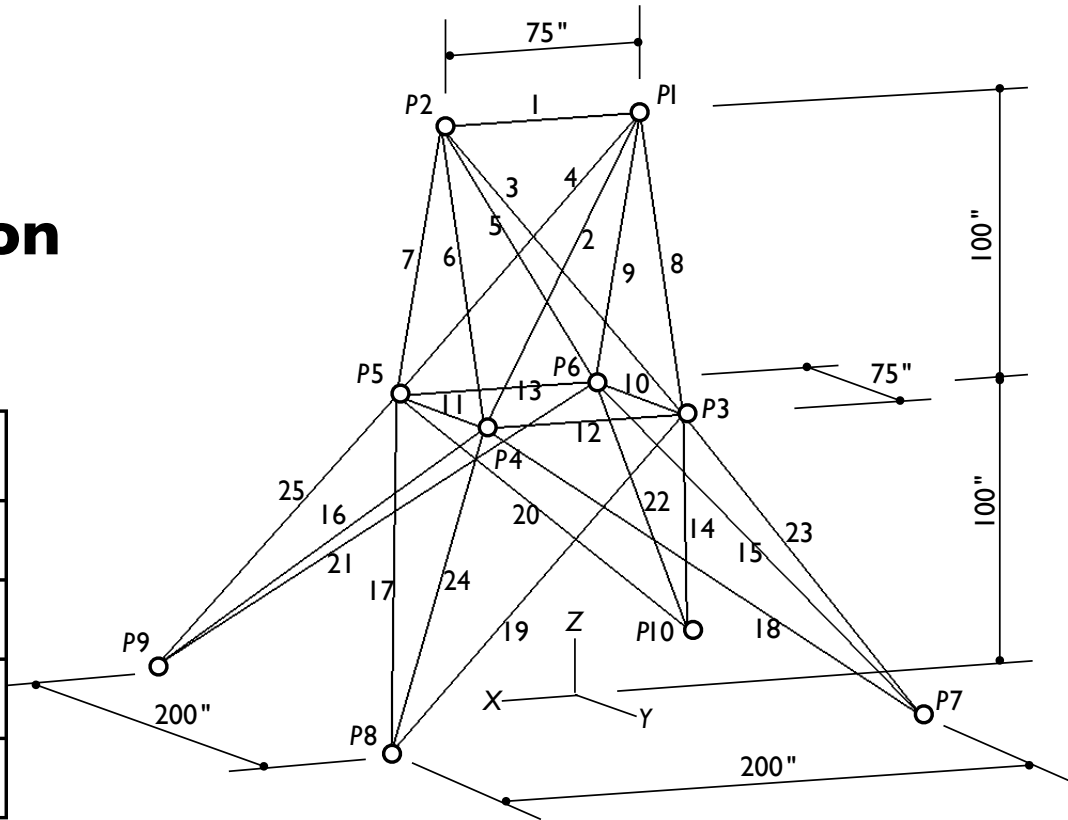
# Section 7.2

## 3D Truss

### Problem Description

Design Loads for the Transmission Tower

Joint	$F_x$ (lb)	$F_y$ (lb)	$F_z$ (lb)
P1	1,000	-10,000	-10,000
P2	0	-10,000	-10,000
P3	500	0	0
P6	600	0	0



# Techniques/Concepts

- Create points
- Concepts>Lines From Points
- Convergence of straight beam elements

**A: Static Structural**

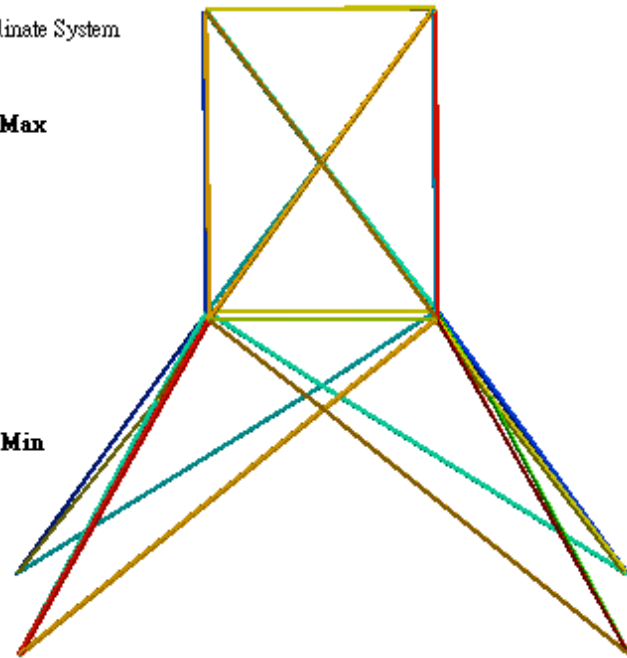
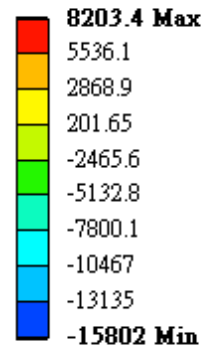
Axial Force

Type: Directional Axial Force (Unaveraged)(X Axis)

Unit: lbf

Solution Coordinate System

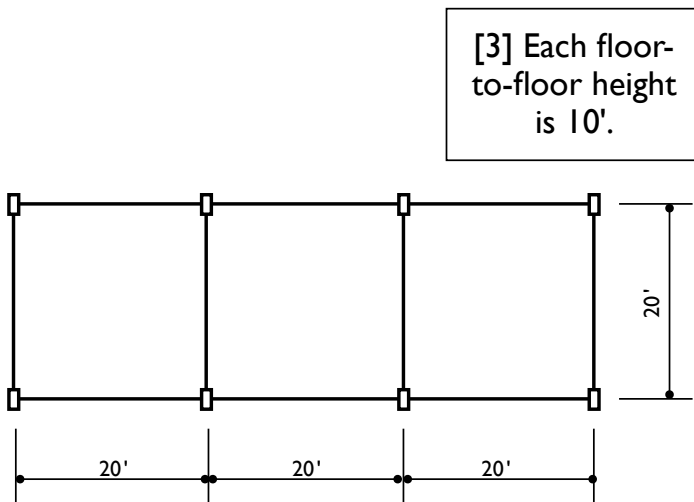
Time: 1



# Section 7.3

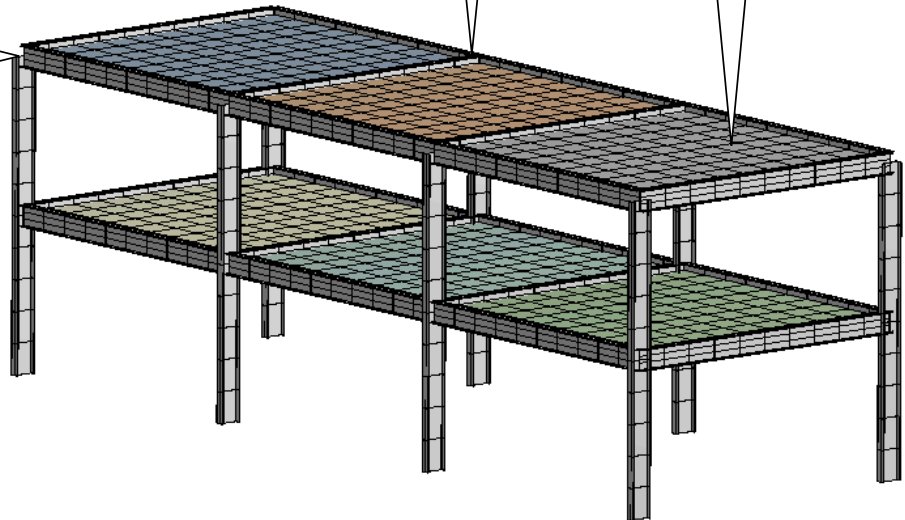
## Two-Story Building

### Problem Description



[1] All beams and columns are made of structural steel, with a cross section of W16x50.

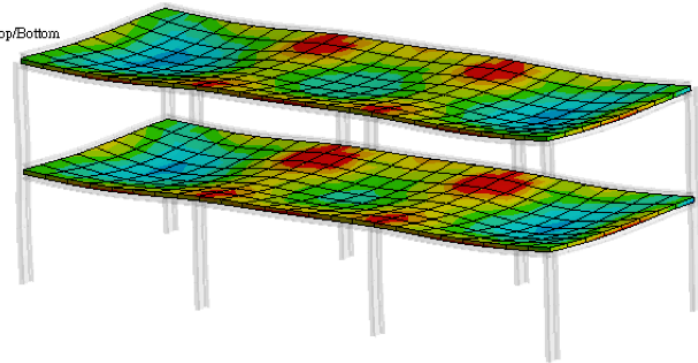
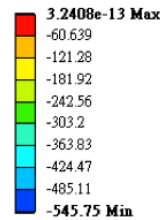
[2] The floor slabs are made of reinforced concrete, with a thickness of 5".



# Techniques/Concepts

- Adjust Cross Section Alignments
- Concepts>Surface From Edges
- Use of Selection Panes
- Flip Surface Normal
- Form New Part
- Import Engineering Data
- Inertial>Standard Earth Gravity
- Inertial>Acceleration

**A: Static Structural**  
 Minimum Principal Stress  
 Type: Minimum Principal Stress - Top/Bottom  
 Unit: psi  
 Time: 1



**A: Static Structural**  
 Minimum Combined Stress  
 Type: Minimum Combined Stress - Top/Bottom  
 Unit: psi  
 Time: 1

