53:134 Structural Design II (Steel Structures)  
Spring 2006 (Lecture Summary)  
Week 7 (2/27 - 3/3/06)

2/27/06
♦ Review of direct stiffness method for springs - discuss basic steps. Solution of HW#11: 6.2.1.
♦ Truss Analysis:
  o Element equilibrium equation in the local coordinate system.
  o Transformations from local to global coordinate system. Local displacements in terms of global displacements; global forces in terms of local forces.
  o Element equilibrium equation in the global coordinate system.
♦ Read: Section 6.2.
♦ HW#12: P6.2.2.

3/1/06
♦ Review of element equilibrium equations in terms of local and global coordinate systems. Solution of HW#12: P6.2.2.
♦ Truss Analysis:
  o Element equilibrium equation in the local coordinate system.
  o Transformation from local to global coordinate system.
  o Equilibrium equation in the global coordinate system.
Assembly of the global equilibrium equation.
Application of boundary conditions.
Solution of equilibrium equations.
Element force recovery.


Recovery of reaction forces: two procedures – use of global equilibrium equations, and use of equilibrium equations at the supports.

Read: Section 6.2.

HW#13: P6.2.6.

3/3/06

Review of truss analysis using stiffness method: assembly of global equations, application of boundary conditions, solution of the reduced equilibrium equations, element force recovery.

Solution of HW#13: 6.2.6.

Use of more efficient way to generate global equilibrium equations. Example 6.2.4, p. 354.

Recovery of reaction forces: two procedures – use of global equilibrium equations, and use of equilibrium equations at the supports.

3D truss element.

Read: Section 6.2.2, Truss Analysis.

HW#14: 6.2.12 (also calculate the support reactions).