CVEN 7511 - Fall 2001

Computational Mechanics of Solids and Structures

Homework # 4

Nonlinear Snap-Through Analysis of Two-Bar Truss:

1. Problem:

   Develop the nonlinear load-displacement relationship which governs the vertical motion of a two-bar von Mises truss during snap- through. Assuming $a = 1000mm, h = 1000mm, A = 100mm^2, E = 200GPa$, determine the SDOF-response under displacement control and identify the critical points of snap-through.

2. Compare the Total Lagrange with the Updated Lagrange solution strategies to analyze the nonlinear load-deflection response of the von Mises truss above. Assuming elastic material behavior, develop a nonlinear solver, e.g. based on Newton-Raphson iteration, to capture the geometric nonlinearity during snapping.