2.094

FINITE ELEMENT ANALYSIS OF SOLIDS AND FLUIDS

SPRING 2008

Homework 6

	Assigned:	03/13/2008
Instructor: Prof. K. J. Bathe	Due:	03/20/2008

Problem 1 (20 points):

Consider Example 6.3 in the textbook, pages 494, 495.

Assume that the equilibrium has been established for $\dfrac{^t R}{2kL} = 2 \times 10^{-3}$ where $\dfrac{^t \Delta}{L} = 3.70223 \times 10^{-2}$. Next, the

equilibrium for $\dfrac{^{t+\Delta t} R}{2kL} = 3 \times 10^{-3}$ shall be established. Perform the full Newton-Raphson iteration in Eqs. (6.11)

and (6.12) to calculate $\dfrac{^{t+\Delta t} \Delta}{L}$. Use as the convergence criterion $\dfrac{1}{2kL} \left({^{t+\Delta t} R} - {^{t+\Delta t} F^{(i-1)}} \right) = 1.0 \times 10^{-6}$.

Calculate the tangent stiffness matrices using the finite difference scheme given in class; you need to select an "appropriate ε".

Give a table listing the values calculated in each iteration.

Problem 2 (10 points):

Exercise 6.1 in the textbook, page 529.

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