Problem 1 (20 points):

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

Assume that the equilibrium has been established for \(\frac{R}{2kL} = 2 \times 10^{-3}\) where \(\frac{\Delta}{L} = 3.70223 \times 10^{-2}\). Next, the equilibrium for \(\frac{R_{+\Delta}}{2kL} = 3 \times 10^{-3}\) shall be established. Perform the full Newton-Raphson iteration in Eqs. (6.11) and (6.12) to calculate \(\frac{\Delta}{L}\). Use as the convergence criterion \(\frac{1}{2kL} \left( \frac{R_{+\Delta}}{2kL} - \frac{R_{+\Delta} F_{(i-1)}}{2kL} \right) = 1.0 \times 10^{-6}\).

Calculate the tangent stiffness matrices using the finite difference scheme given in class; you need to select an “appropriate \(\varepsilon\)”.

Give a table listing the values calculated in each iteration.

Problem 2 (10 points):

Exercise 6.1 in the textbook, page 529.