Problem 1 (20 points):

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

Assume that the equilibrium has been established for \( \frac{\dot{R}}{2kL} = 2 \times 10^{-3} \) where \( \frac{\Delta}{L} = 3.70223 \times 10^{-2} \). Next, the equilibrium for \( \frac{\dot{R} + \Delta}{2kL} = 3 \times 10^{-3} \) 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 \( \frac{1}{2kL} \left( \frac{\dot{R} + \Delta}{\dot{R} - \dot{R}^{(i-1)}} \right) = 1.0 \times 10^{-6} \).

Calculate the tangent stiffness matrices using the finite difference scheme given in class; you need to select an “appropriate \( \varepsilon \)”. Give a table listing the values calculated in each iteration.

Problem 2 (10 points):

Exercise 6.1 in the textbook, page 529.