

Assignment 2

1. Cantilever Beam

- A) Calculate the local stiffness matrix for a shear stiff beam element. The element and the corresponding degrees of freedom are given in Figure 1.

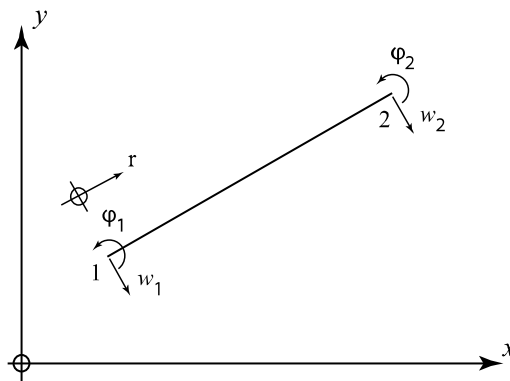


Figure 1. Beam element

Hint:

$$w(r) = a_1 + a_2 r + a_3 r^2 + a_4 r^3$$

$$r_1 = 0, \quad r_2 = 1$$

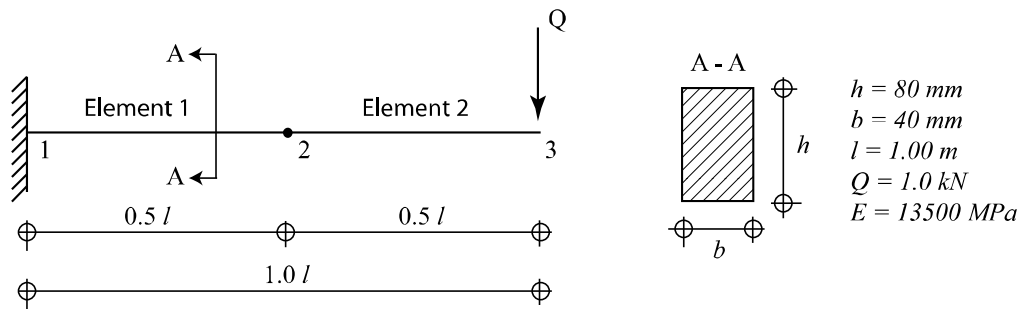
$$x_2 - x_1 = L$$

- B) Calculate the global stiffness matrix for the two element cantilever beam given in Figure 2. Use local stiffness matrix for a shear stiff beam element derived in part A)

Name :

Stud. Nr.:

Date :



- C) Calculate the displacement of the two element cantilever beam given in Figure 2 at the location 3 by using the global stiffness matrix calculated in part B).