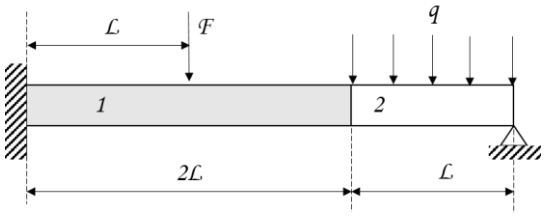
Department of Applied Mechanics and Biomedical Engineering, Indian Institute of Technology, Madras.

Fundamentals of Finite Element Analysis (AM 5450)

Assignment 5: TRUSS AND BEAM PROBLEMS

1. Compute the nodal solutions in the beam shown below:

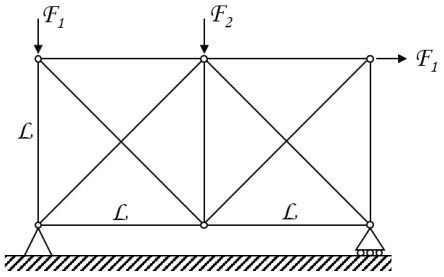


The beam is made of 2 materials with perfect bonding in the interface; One end is fixed; other end is supported by a pin. The geometric and force values are as given:

E_1 = 200 GPa, E_2 = 70 GPa, L = 2 m, q = 10 kN/m, F = 18 kN, I = $4x10^{-4}$ m^4

(i) Find the deflection at the interface between two materials.

2. Consider a truss structure shown below.



E = 200 GPa, Diameter = 20 mm, L = 0.5 m, F_1=10 kN, F_2=12 kN

(i) Solve for the nodal displacements and support reactions.
(ii) Find elemental forces and stresses.
(iii) Plot the deformed and un-deformed structure in a single figure