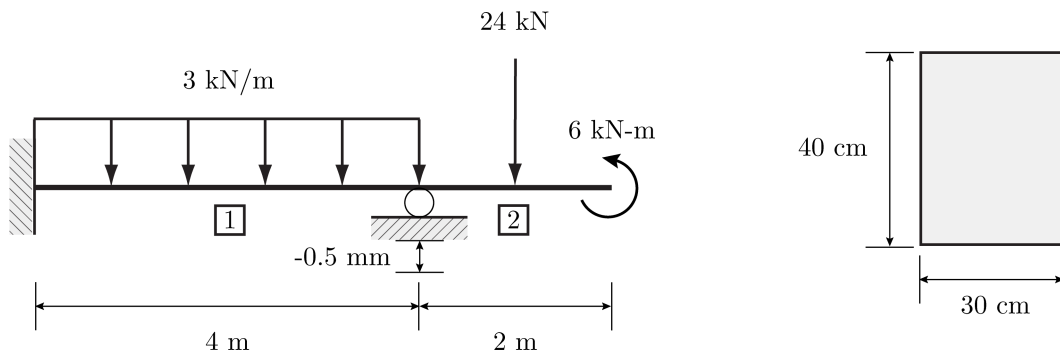


CE 525 Fall 2024 HW#4

Due Tuesday, October 22, at the beginning of class

1. For the beam shown below determine joint displacements/rotations, support reactions, and shear force / bending moment diagrams using the Matrix Displacement Method:



$E = 20 \text{ GPa}$ for all members

- a. (10 pts) By hand (via Bernoulli-Euler Beam Theory)
- b. (10 pts) Using computer programming and the $\{P_{fs}\}$ approach outlined in class
- c. (10 pts) Using SAP2000

Extra Credit (10 pts): Using programming and the staggered solution approach where:

$$\begin{Bmatrix} P \\ R \end{Bmatrix} = \begin{Bmatrix} P_f \\ R_f \end{Bmatrix} + \begin{bmatrix} S_{FF} & S_{FR} \\ S_{RF} & S_{RR} \end{bmatrix} \begin{Bmatrix} d_F \\ d_R \end{Bmatrix}$$