CE 525 Fall 2024 HW#9 – Extra Credit

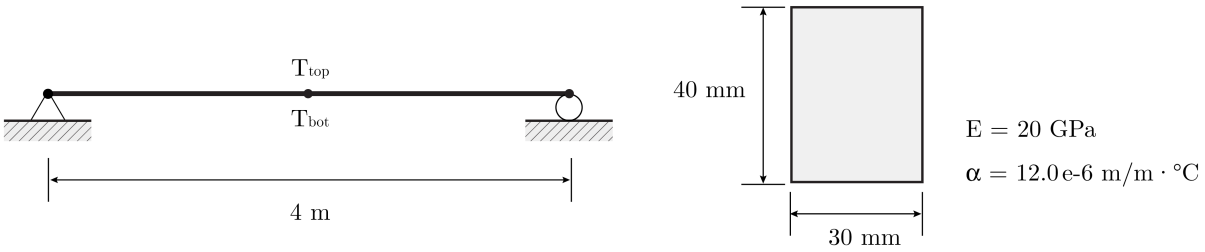
Due Tuesday, December 03, at the beginning of class

Note: point values added to lowest mid-term exam score.

For the plane frames shown: determine joint displacements, member-end forces, and support reactions using the Matrix Displacement Method via: (i) computer programming and (ii) SAP2000.

1. (1.5 pts) *Uniform increase in temperature*: $T_{top} = T_{bot} = 20°C$

   a. Simply Supported



   b. Pinned-Pinned

   c. Fixed-Fixed

2a-c. (1.5 pts) *Uniform decrease in temperature*: $T_{top} = T_{bot} = -20°C$

3a-c. (1.5 pts) *Temperature gradient through the depth*: $T_{top} = 0°C$ (no change)
$T_{bot} = 20°C$ (increase)

4a-c. (1.5 pts) *Temperature gradient through the depth*: $T_{top} = -10°C$ (decrease)
$T_{bot} = 10°C$ (increase)

5. (2 pts) Compare and comment on the results.