

The list of numerical answers for 3D7

1b)

$$\mathbf{k}_e = \begin{bmatrix} -\frac{\alpha}{2} + \frac{\beta}{l} & \frac{\alpha}{2} - \frac{\beta}{l} \\ -\frac{\alpha}{2} - \frac{\beta}{l} & \frac{\alpha}{2} + \frac{\beta}{l} \end{bmatrix}$$

2a)

$$\mathbf{f}^T = [-10 \quad 0 \quad -10 \quad -20]$$

2b)

$$\mathbf{K} = \begin{bmatrix} \text{---} & \text{---} & \text{---} & \text{---} \\ \text{---} & \text{---} & \text{---} & \text{---} \\ \text{---} & \text{---} & \frac{9}{4} & -\frac{9}{4} \\ \text{---} & \text{---} & -\frac{9}{4} & \left(\frac{13}{4} + \frac{13}{4} \cdot 2\right) \end{bmatrix}$$

2c)

$$\begin{bmatrix} T_3 \\ T_4 \end{bmatrix} = \begin{bmatrix} -8.44 \\ -4 \end{bmatrix}$$

$$q_n = 1.7285$$

3a)

$$\epsilon_{xx} = \frac{1}{5}$$

$$\epsilon_{xx} = \frac{1}{50}$$

- 4b) 1D: Reduction factor 4
2D: Reduction factor 2
3D: Reduction factor 1.59