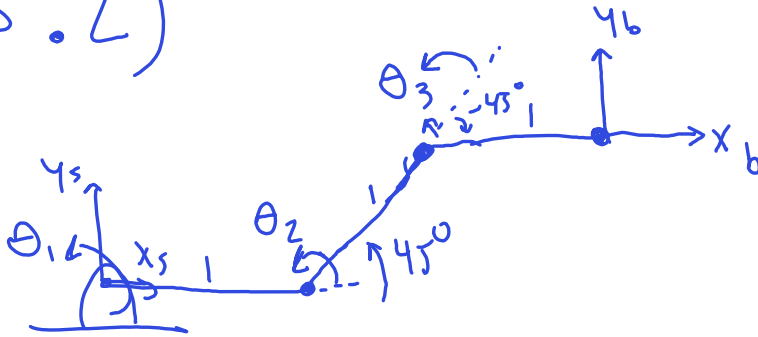


5.2)



planar
 $m=3$

$$a) \quad \mathbf{f} = \begin{bmatrix} \mathbf{I} \\ \mathbf{F} \end{bmatrix} = \begin{bmatrix} 0 \\ 5 \\ 0 \end{bmatrix}$$

$$\mathbf{z} = \mathbf{J}^T(\theta) \mathbf{f}$$

$$\mathbf{J}_6 \in \mathbb{R}^{3 \times 3} \quad @ \text{ current config}$$

by inspection:

$$\begin{bmatrix} 1 & 1 & 1 \\ \frac{\sqrt{2}}{2} & -\frac{\sqrt{2}}{2} & 0 \\ 2 + \frac{\sqrt{2}}{2} & 1 + \frac{\sqrt{2}}{2} & 1 \end{bmatrix}$$

$$\mathbf{z} = \begin{bmatrix} 1 & \frac{\sqrt{2}}{2} & 2 + \frac{\sqrt{2}}{2} \\ 1 & -\frac{\sqrt{2}}{2} & 1 + \frac{\sqrt{2}}{2} \\ 1 & 0 & 1 \end{bmatrix} \begin{bmatrix} 0 \\ 5 \\ 0 \end{bmatrix} = \begin{bmatrix} -\frac{\sqrt{2}}{2} \\ -\frac{\sqrt{2}}{2} \\ 0 \end{bmatrix}$$