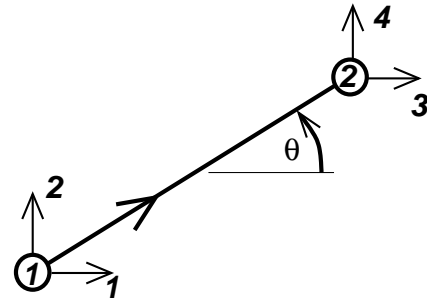


 Bar Direction

① Local Joint Number

 Local Degree of Freedom in Global Directions



Local Coordinate System in Global Directions

$$\mathbf{K} = \frac{EA}{L} \begin{bmatrix} c^2 & cs & -c^2 & -cs \\ cs & s^2 & -cs & -s^2 \\ -c^2 & -cs & c^2 & cs \\ -cs & -s^2 & cs & s^2 \end{bmatrix}$$

$$T = \frac{EA}{L} [c(v_3 - v_1) + s(v_4 - v_2)]$$

| | Local | Global |
|-----------------------|--------------|----------------|
| Element Deflection | \mathbf{u} | \mathbf{v} |
| Element Force | \mathbf{q} | \mathbf{f} |
| Element Stiffness | \mathbf{k} | \mathbf{K} |
| Structural Deflection | - | \mathbf{d} |
| Structural Loads | - | \mathbf{p} |
| Structural Stiffness | - | \mathbf{K}_s |

$$\begin{bmatrix} a & b \\ c & d \end{bmatrix}^{-1} = \frac{1}{ad - bc} \begin{bmatrix} d & -b \\ -c & a \end{bmatrix}$$