

Steifigkeitsmatrix des Stabes im 3-Dim.

$$[k] = \begin{bmatrix} \frac{EA}{L} & 0 & 0 \\ 0 & \frac{EA}{L} & 0 \\ 0 & 0 & \frac{EA}{L} \end{bmatrix}$$

$$\begin{bmatrix} +\frac{EA}{L} & -\frac{EA}{L} \\ -\frac{EA}{L} & +\frac{EA}{L} \end{bmatrix} \cdot \begin{bmatrix} \frac{\partial x}{\partial \xi} & \frac{\partial y}{\partial \xi} & \frac{\partial z}{\partial \xi} \\ \frac{\partial x}{\partial \eta} & \frac{\partial y}{\partial \eta} & \frac{\partial z}{\partial \eta} \end{bmatrix}$$

$$[k] = \frac{EA}{L}$$

$$\begin{bmatrix} +\frac{\partial x^2}{\partial \xi^2} & +\frac{\partial x \partial y}{\partial \xi^2} & +\frac{\partial x \partial z}{\partial \xi^2} & -\frac{\partial x^2}{\partial \eta^2} & -\frac{\partial x \partial y}{\partial \eta^2} & -\frac{\partial x \partial z}{\partial \eta^2} \\ +\frac{\partial x \partial y}{\partial \xi^2} & +\frac{\partial y^2}{\partial \xi^2} & +\frac{\partial y \partial z}{\partial \xi^2} & -\frac{\partial x \partial y}{\partial \eta^2} & -\frac{\partial y^2}{\partial \eta^2} & -\frac{\partial y \partial z}{\partial \eta^2} \\ +\frac{\partial x \partial z}{\partial \xi^2} & +\frac{\partial y \partial z}{\partial \xi^2} & +\frac{\partial z^2}{\partial \xi^2} & -\frac{\partial x \partial z}{\partial \eta^2} & -\frac{\partial y \partial z}{\partial \eta^2} & -\frac{\partial z^2}{\partial \eta^2} \\ -\frac{\partial x^2}{\partial \xi^2} & -\frac{\partial x \partial y}{\partial \xi^2} & -\frac{\partial x \partial z}{\partial \xi^2} & +\frac{\partial x^2}{\partial \eta^2} & +\frac{\partial x \partial y}{\partial \eta^2} & +\frac{\partial x \partial z}{\partial \eta^2} \\ -\frac{\partial x \partial y}{\partial \xi^2} & -\frac{\partial y^2}{\partial \xi^2} & -\frac{\partial y \partial z}{\partial \xi^2} & +\frac{\partial x \partial y}{\partial \eta^2} & +\frac{\partial y^2}{\partial \eta^2} & +\frac{\partial y \partial z}{\partial \eta^2} \\ -\frac{\partial x \partial z}{\partial \xi^2} & -\frac{\partial y \partial z}{\partial \xi^2} & -\frac{\partial z^2}{\partial \xi^2} & +\frac{\partial x \partial z}{\partial \eta^2} & +\frac{\partial y \partial z}{\partial \eta^2} & +\frac{\partial z^2}{\partial \eta^2} \end{bmatrix}$$