Matrix

Eigenvectors: find eigenvalues, then solve

$$A - \lambda I = 0$$

A – λI = 0

Lagrange

$$\frac{d}{dt}(\frac{\partial L}{\partial x}) - \frac{\partial L}{\partial x} = 0$$

dtd (∂x˙∂L) – ∂x∂L = 0

Structures

Euler Bernoulli

$$EI\frac{d^2y}{dx^2} = F(x)$$

EIdx2d2y = F (x)

FEM

Bending Matrix

FEMEmbedded note

$$K = \frac{EI}{L^3}\begin{bmatrix} 12 & 6L & -12 & 6L \\ 6L & 4L^2 & -6L & 2L \\ -12 & -6L & 12 & -6L \\ 6L & 2L^2 & -6L & 4L^2 \end{bmatrix}$$

K = L3EI ⎣⎡126L–126L6L4L2–6L2L2–12–6L12–6L6L2L–6L4L2⎦⎤

$$K = \begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix}$$

K = [1–1–11]

$$Ku = F$$

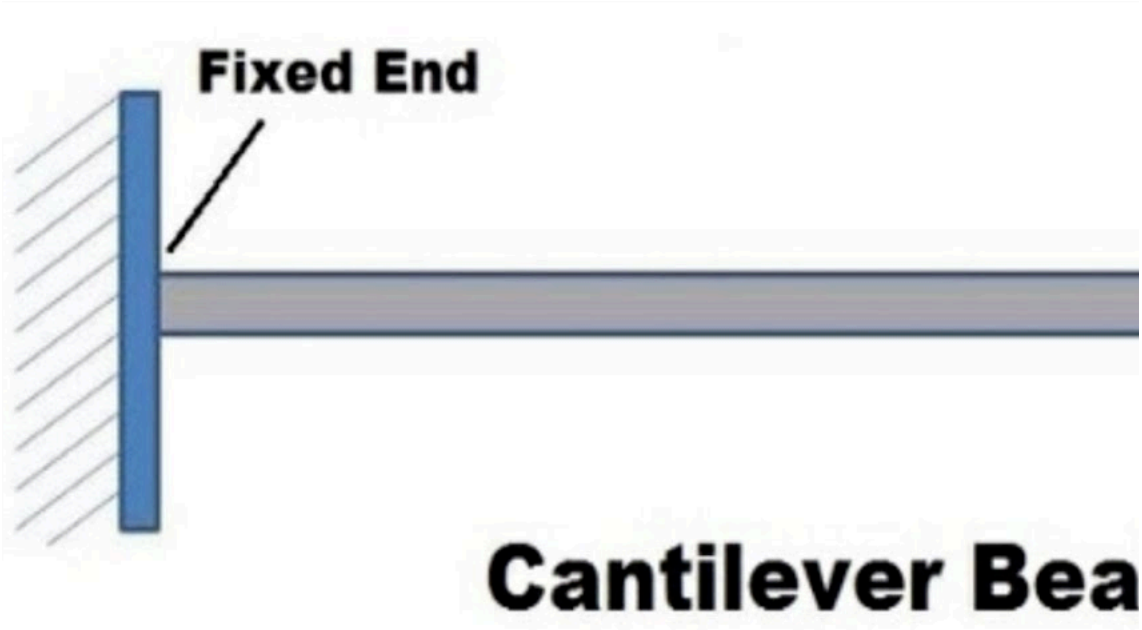
Ku = F

FEM · ^element-stifness-matrixFEM · ^element-stifness-matrix · Embedded block

$$K = \frac{EI}{L^3}\begin{bmatrix} 12 & 6L & -12 & 6L \\ 6L & 4L^2 & -6L & 2L \\ -12 & -6L & 12 & -6L \\ 6L & 2L^2 & -6L & 4L^2 \end{bmatrix}$$

K = L3EI ⎣⎡126L–126L6L4L2–6L2L2–12–6L12–6L6L2L–6L4L2⎦⎤

Cantilever Beam ImageImage



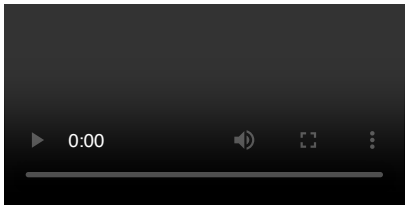
Cantilever Beam Image

Axial Stress Matrix

$$K = \begin{bmatrix} 1 & -1 \\ -1 & 1 \end{bmatrix}$$

K = [1–1–11]

Sample VideoVideo



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