CE394M: 1D-Finite Element Method

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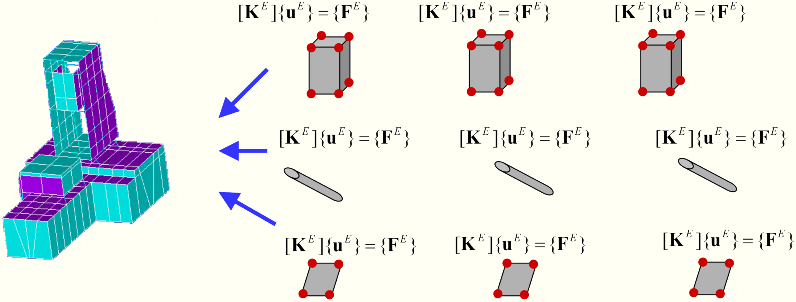
Overview

Finite Element Analysis



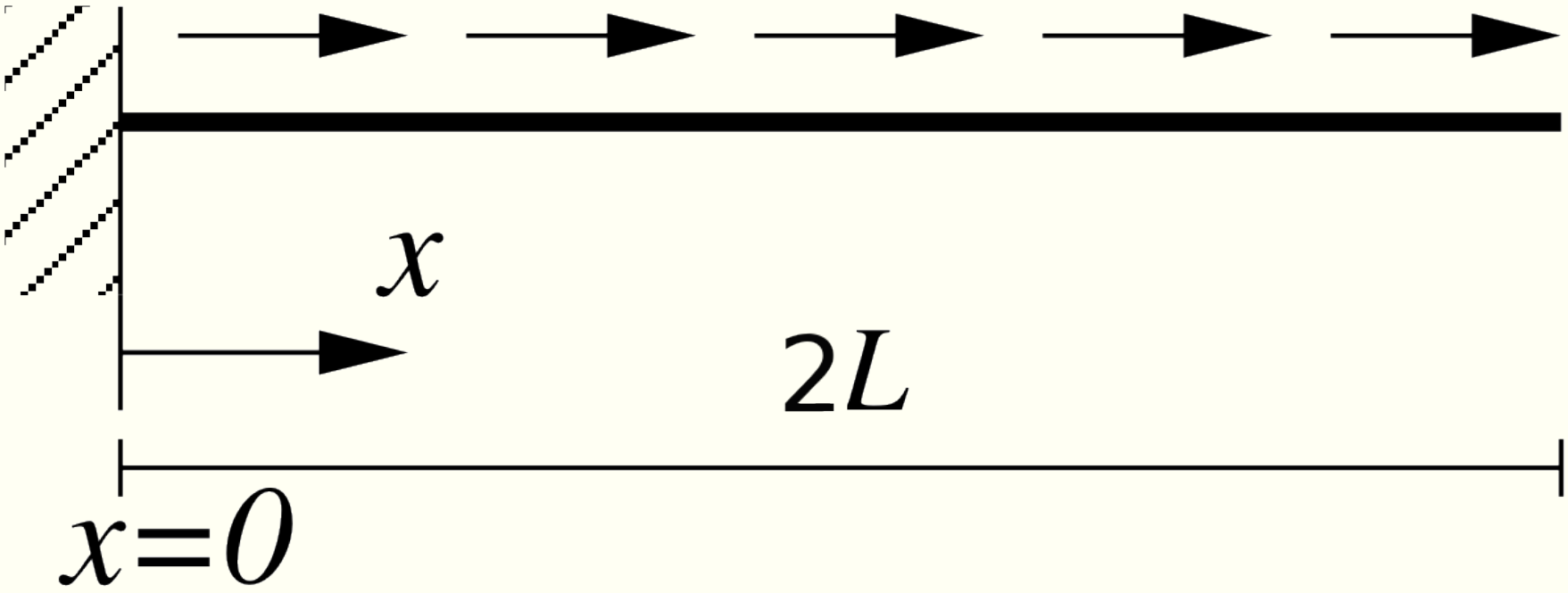
$$[\mathbf{K}]\{\mathbf{u}\} = \{\mathbf{F}\} \longrightarrow \{\mathbf{u}\} = [\mathbf{K}]^{-1}\{\mathbf{F}\}$$

Finite Element Analysis

FEM is a systematic procedure for approximating differential equations. For any problem in any spatial dimension it follows the same steps:

1. Identify the equation of interest
2. Cast the equation of interest in a weak form
3. Select a finite element type
4. Construct the element matrix and vector
5. Assemble the global matrix and vector and apply boundary conditions
6. Solve the system of linear equations

1D Finite Element Analysis of a cantilever beam



1D cantilever beam