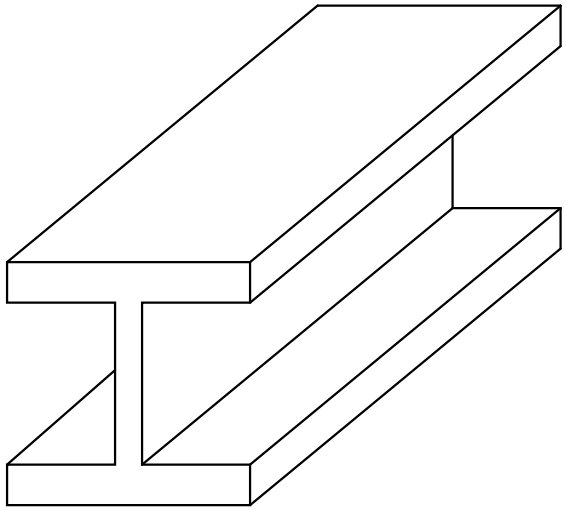
CEE384—Numerical Methods

LU Decomposition

Solving Linear Systems of Equations



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1 Overview

$$\mathbf{LU} = \mathbf{A} \tag{1}$$

$$\mathbf{Ax} = \mathbf{b} \tag{2}$$

$$\mathbf{PAx} = \mathbf{Pb} \equiv \mathbf{d} \tag{3}$$

$$\mathbf{Ly} = \mathbf{d}, \mathbf{y} \equiv \mathbf{Ux} \tag{4}$$

$$\mathbf{Ux} = \mathbf{y} \tag{5}$$

$$L_{i,j} = \frac{A_{i,j}}{A_{j,j}} \tag{6}$$

$$U_{i,:} - = L_{i,j} U_{j,:} \tag{7}$$

References

[1] Chapra, Steven C. and Canale, Raymond P., *Numerical Methods for Engineers*, 7th ed. McGraw Hill Education, 2015.

[2] A. K. Kaw, E. E. Kalu, and D. Nguyen. Numerical methods with applications. [Online]. Available: http://nm.mathforcollege.com/topics/textbook_index.html