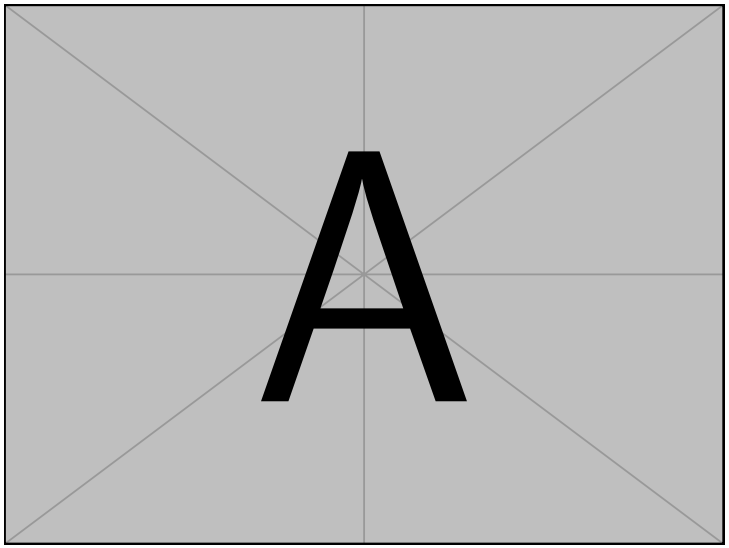
CEE384—Numerical Methods

Integration

Numerical Integration



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Contents

$$I \equiv \int_a^b f(x)dx \tag{1}$$

1 Trapezoidal Rule

$$I \approx \frac{\Delta x}{2}\left[f(a) + \sum_{i=1}^{i<n-1} 2f(i\Delta x) + f(b)\right] \tag{2}$$

2 Simpson's Rule

$$I \approx \frac{\Delta x}{3}\left[f(a) + 4\sum_{i=\{1,3,5,\dots\}}^{i<n} f(a+i\Delta x) + 2\sum_{i=\{2,4,6,\dots\}}^{i<n} f(a+i\Delta x) + f(b)\right] \tag{3}$$

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