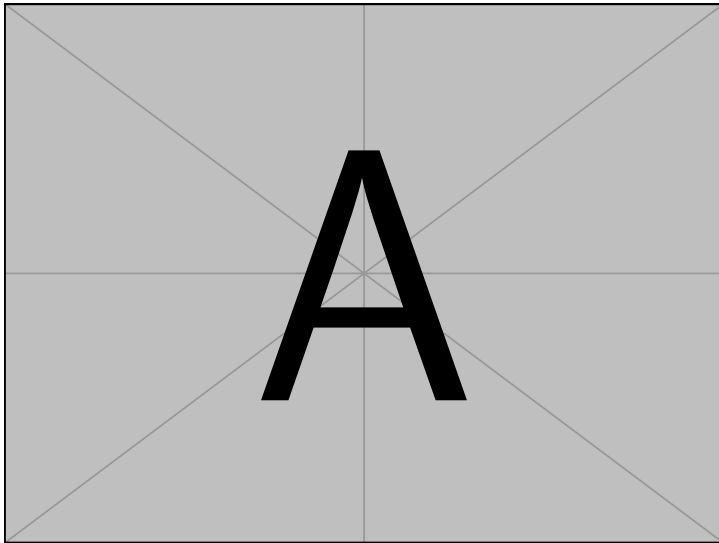


*CEE384—Numerical Methods*

# Integration

*Numerical Integration*



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$$I \equiv \int_a^b f(x) dx$$

(1)

## 1 Trapezoidal Rule

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

## 2 Simpson's Rule

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

## 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](http://nm.mathforcollege.com/topics/textbook_index.html)