

Introduction to Week Four

Elementary Integration Formulas

- ✓

Video: Midpoint Rule | Lecture 36
8 min
- ✓

Reading: The Midpoint Rule is the Area of a Rectangle
5 min
- ✓

Reading: Midpoint Rule for a Quadratic Function
10 min
- ✓

Video: Trapezoidal Rule | Lecture 37
8 min
- ✓

Reading: Derive the Trapezoidal Rule
10 min
- ✓

Video: Simpson's Rule | Lecture 38
6 min
- ✓

Reading: Derive Simpson's Rule
15 min

Composite Integration Formulas

Quadrature in MATLAB

Interpolation

Interpolation in MATLAB

Quiz

Programming Assignment: Bessel Function Zeros

Derive Simpson's Rule

Derive Simpson's rule by approximating $f(x)$ by a quadratic polynomial connecting the points $(0, f(0)), (h, f(h))$ and $(2h, f(2h))$.

(a) Let $g(x) = a + bx + cx^2$. Determine the values of a, b and c such that $g(x)$ passes through the points $(0, f(0)), (h, f(h))$ and $(2h, f(2h))$.

(b) Use $f(x) \approx g(x)$ to derive Simpson's rule.

✓ Completed

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