

Introduction to Week Five

Initial Value Problems

- ✓

Video: Euler Method | Lecture 48
7 min
- ✓

Reading: When the Euler Method is Exact
10 min
- ✓

Video: Modified Euler Method | Lecture 49
9 min
- ✓

Reading: When the Modified Euler Method is Exact
10 min
- ▶

Video: Runge-Kutta Methods | Lecture 50
12 min
- ▶

Video: Second-Order Runge-Kutta Methods | Lecture 51
7 min
- ▢

Reading: Ralston's Method
5 min
- ▢

Reading: Runge-Kutta Methods and Quadrature Formulas
10 min
- ▶

Video: Higher-Order Runge-Kutta Methods | Lecture 52
10 min
- ▢

Reading: Fourth-Order Runge-Kutta Method and Simpson's Rule
10 min

Systems of Differential Equations

Initial Value Problems in MATLAB

Boundary Value Problems

Quiz

Programming Assignment: The Two-Body Problem

When the Modified Euler Method is Exact

Let $\dot{x} = bt$, with initial condition $x(0) = x_0$ and b a constant. With $t = n\Delta t$, show that the Modified Euler method results in the exact solution

$$x(t) = x_0 + \frac{1}{2}bt^2.$$

✓ Completed

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