MIT 16.90 Spring 2013: Problem Set 1

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Due: Friday Feb 15, in class

Problem 1. 1 *Reading Assignment*

- Unit I: 1. Introduction to Numerical Methods for ODEs.

- Unit I: 2. Convergence of Numerical Methods.

- Unit I: 3. Accuracy of Numerical Methods.

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Problem 1. 2 *Truncation error analysis*

Consider the following numerical integration schemes:

1.
$$v^{n+1} = \frac{3}{2}v^n - \frac{1}{2}v^{n-1} + \frac{1}{2}\Delta t F(v^n)$$

2.
$$v^{n+1} = v^n + \frac{4}{3}\Delta t F(v^n) - \frac{1}{3}\Delta t F(v^{n-1})$$

- Determine the leading term of the local truncation error and identify the local order of accuracy.

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