Higher Order Ordinary Differential Equations: Example

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Given

$$\frac{d^2y}{dt^2} + 2\frac{dy}{dt} + y = e^{-t}, y(0) = 1, \frac{dy}{dt}(0) = 2$$

Use a step size of $h = 0.25$.

a) Estimate $y(0.50)$ by Euler's method.

b) Find the absolute relative true error for part(a), if

$y(0.50)|_{exact} = 1.592$

c) Estimate $\frac{dy}{dt}(0.50)$ by Euler's method.

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