

Euler Assignment

Scientific Computing

Target Due Date: Friday, January 19, 2018

College of the Atlantic

Write a program that implements Euler's algorithm. It should have the following features.

- The initial condition, starting and ending values, and the step size should be easy to change.
- The right-hand side of the equation should be easy to change.
- The program should print the Euler solution as markers and lines.
- There should be an option to also print the exact solution, if one is known.
- Your code should include comments and should be easy to read.
- Do as much of the coding as you can on your own, from scratch.

Use your code to produce analyze the differential equation

$$\frac{dT}{dt} = -0.1(T - 25). \quad (1)$$

On the same axes, make plots of the Euler solution for $\Delta t = 1$ and $\Delta t = 0.25$. Also include a plot of the exact solution, which is:

$$T(t) = 25 - 20e^{-0.1t}. \quad (2)$$

Optional: Verify that Eq. (2) solves Eq. (1). Recommended for those with a calc background, but certainly not required.