Assignment 6

October 27, 2024

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Q.1 Derive a class called FowardEulerSolver from the abstract class AbstractOdeSolver, that allows the user to specify the function RightHandSide, and contains a method SolveEquation that uses the forward Euler method to calculate the values of y_i as described in the class notes, and writes the values of t_i and y_i to file.

Test the class FowardEulerSolver using the initial value ordinary differential equation

$$\frac{dy}{dt} = 1 + t$$

for the time interval 0 < t < 1, and with initial condition y = 2 at t = 0. This equation has solution $y = (t^2 + 2t + 4)/2$. Investigate how the choice of step size affects the accuracy of the solution (compute solutions with different h and plot and make a conclusion).

Q.2 Repeat the above using the fourth order Runge–Kutta method to calculate the values of y_i .