

Homework 10  
due April 19, 2007

Please answer all parts of a question! Late homeworks will be penalized using the complementary error function, as in homework 8.

SUGGESTION: use Matlab or equivalent to solve the differential equations.

1. Chapra and Canale, problem 25.2, EXCEPT use the differential equation

$$\frac{dy}{dt} = y(t^3 - 1.5)$$

with initial condition  $y(0)=1$ . Compare (on a graph) your results from the first three problems with a smooth curve that represents the analytic solution,

$$y = \exp(0.25t^4 - 1.5t)$$

2. Chapra and Canale, problem 25.3, EXCEPT (1) use the differential equation

$$\frac{dy}{dt} = y(t^3 - 1.5)$$

with initial condition  $y(0)=1$ , and (2) don't iterate the corrector.

3. Chapra and Canale, problem 25.5, EXCEPT use the differential equation

$$\frac{dy}{dt} = y(t^3 - 1.5)$$

with initial condition  $y(0)=1$ . Comment on your findings about the differences between the analytic solution and those from the Euler, Heun, and classic Runge-Kutta methods.

4. Chapra and Canale, problem 28.7