

AMSC/CMSC 460 Quiz 8 , Fall 2001

Show all work. You may leave arithmetic expressions in any form that a calculator could evaluate. By putting your name on this paper, you agree to abide by the university's code of academic integrity in completing the quiz. Use no books, calculators, cellphones, communication with others, scratchpaper, etc.

Name _____

Student number _____

1. (10) Let

$$\begin{aligned}y' &= y^2 - 5t \\ y(0) &= 1\end{aligned}$$

Apply a PECE scheme to this problem, using Euler and Backward Euler with a stepsize $h = .1$, to obtain an approximation for $y(.1)$.

2. (10) Suppose we have two approximations to y_{n+1}

$$y_{n+1} = y_n + \frac{h}{2}(3f_n - f_{n-1})$$

$$y_{n+1} = y_n + \frac{h}{12}(5f_{n+1} + 8f_n - f_{n-1})$$

the error formula for the first is $\frac{5h^3}{12}y^{(3)}(\eta)$ and for the second is $-\frac{h^4}{24}y^{(4)}(\eta)$.
How would you estimate the error in the first approximation?