AMSC/CMSC 660 Quiz 7 , Fall 2003

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) Suppose we solve the problem

$$\begin{aligned} y'' &= 6y' - ty + y^2 \\ y(0) &= 5 \\ y(1) &= 0 \end{aligned}$$

using the finite difference method, approximating $y_i \approx y(ih)$ where $h = .01$, $i = 0, \ldots, 100$. We will use a nonlinear equation solver on the system $F(y) = 0$, where there are 99 unknowns and 99 equations. Write the equations for $F(y)$.

2. (10) Apply one step of Newton's method (with step-length equal to 1) to the problem

$$\min_x x_1^4 + x_2(x_2 - 1)$$

starting at the point $x_1 = 2$, $x_2 = -1$.