

AMSC/CMSC 660 Quiz 6 , 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) Recall the Matlab demonstration program `travel.m` for computing an approximate solution to a traveling salesperson problem using a randomized algorithm. What changes would you need to make to that program to change it into a Metropolis algorithm?

2. (10) Suppose we have used the Adams-Bashforth and Adams-Moulton methods of order 3 to form two estimates of  $y(t_{n-1})$ , the solution to a differential equation. These formulas are:

$$y_{n+1}^{ab} = y_n + \frac{h}{12}(23f_n - 16f_{n-1} + 5f_{n-2}) \text{ error : } \frac{3h^4}{8}y^{(4)}(\eta)$$
$$y_{n+1}^{am} = y_n + \frac{h}{12}(5f_{n+1} + 8f_n - f_{n-1}) \text{ error : } -\frac{h^4}{24}y^{(4)}(\eta)$$

How would you estimate the local error in the Adams-Moulton formula? How would you use that estimate to change  $h$  in order to keep the estimated local error less than a user-supplied local error tolerance  $\tau$  without taking steps smaller than necessary?