AMSC/CMSC 660 Quiz 9 , Fall 2004

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, other electronic devices, communication with others, scratchpaper, etc.

Name _____

1. (10) Consider the problem

$$\min_x x_1^2 + 5x_2^2$$

subject to $x_1 \geq 0$, $x_2 \geq 0$, and $x_1 + 2x_2 = 4$. Use feasible directions and a barrier method to formulate this problem as an unconstrained optimization problem. (2 points for a particular solution to the equality constraint, 2 points for determining the space spanned by the feasible directions, 6 points for the unconstrained problem.)

2. (Max points = 10)
2a. (2) Give two pitfalls of symbolic computation.

2b. (2) What does it mean to say that a problem is ill-conditioned?

2c. (3) Suppose a colleague comes to you with a spectroscopy problem, and you can think of 5 ways to model the experimental error. How would you decide which to use?

2d. (2) When you type `help alg` in Matlab, the result is the beginning set of comments in the file `alg.m`. Give two kinds of information that should be included in these comments.

2e. (3) Suppose you solve the nonlinear equation $f(x) = 0$ using a Matlab routine, and the answers are complex numbers with small imaginary parts. If you know that the true answers are real numbers, what would you do?