AMSC/CMSC 660   Quiz 4   ,   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) Fill in each box with the name of a matrix decomposition that can be used to efficiently solve the given problem in a stable manner.

Find the null space of a matrix	
Solve a least squares problem when the matrix is well conditioned	
Determine the rank of a matrix	
Find the determinant of a matrix	
Determine whether a symmetric matrix is positive definite	

2. (10) Let `W = givens(y)` be a Matlab program that takes a 2×1 vector y as input and returns a Givens matrix W that makes Wy have a zero in its 2nd position.

Write a Matlab program that uses `givens` to reduce a matrix of the form

$$A = \begin{bmatrix} x & x & x & x \\ x & x & x & x \\ 0 & x & x & x \\ 0 & 0 & x & x \end{bmatrix}$$

to upper triangular form, where x indicates a nonzero element. (In other words, do a QR decomposition of this matrix, but don't worry about saving Q.)