Math. 362-01
Summer, 2005
R. B. Kearfott

Fourth Exam
Thursday, July 28, 2005

This exam is closed book. Make sure your name is on all pages. You should put your work on your own paper, and you may keep this exam sheet upon leaving. Be sure to check your work carefully, and to show intermediate computations in a logical presentation. **Full credit will not be given unless computations are shown.** Each entire problem is worth 50 points.

1. Suppose

$$A = \begin{pmatrix} 4 & -1 \\ -1 & 4 \end{pmatrix}.$$

   (a) Compute a set of eigenvalues and eigenvectors of A.

   (b) Is this matrix A diagonalizable? If so, then write down a matrix V and a diagonal matrix D so that $A = VDV^{-1}$.

2. Suppose

$$A = \begin{pmatrix} 3 & 2 \\ 4 & 4 \end{pmatrix}.$$

   In the following computations, you may use decimal approximations.

   (a) Compute a QR factorization of A by using elementary rotations.

   (b) Using your QR factorization, find the solution x to the system $Ax = b$, where $b = (-1, 1)^t$.