Assignment 3

Due Date: 22 April 2015

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

Determine whether the statement is true or false:

1. Similar matrices have the same inverse. F
2. The matrix is invertible if and only if 0 is not an eigenvalue of . T
3. If and are invertible similar matrices, then their inverses and are also similar. T
4. If is an complex matrix and is an complex matrix, then. T
5. Matrix is diagonalizable if it is similar to a diagonal matrix B; there exists an invertible matrix where

 . F

1. If is an orthogonal matrix, then must be 1. F
2. A square complex matrix is called Unitary if its conjugate transpose equals its inverse. T

- - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - - -

For Each Question, Choose the Correct Answer from the Multiple-Choice List.

1. If , and , then =
2. 0
3. The quadratic form expressed in [ ] is:

This should be: [ ] , as the matrix in the quadratic form must be symmetric.

1. Let :

Solve the following questions:

1. Vectors and are given by: and

. Find the dot product .

Since ,

1. Find the eigenvalues and the eigenvectors of the matrix:

|  |
| --- |
| The characteristic equation: . |
| The eigenvalue | The eigenvector |
| 1 |  |
| 4 |  |

1. Find all least square solutions and the error vector of the linear system:

Since , , then

 and ,

For least square solution:

Solve: . We get

For the error vector:

Calculate; - =

1. Is the matrix Orthogonal?

Since

=

Then A is orthogonal.

1. Show that A= is Hermitian

=

= = A