**Department of Aerospace Engineering**

**AE602 Mathematics for Aerospace Engineers**

**Assignment No. 8**

**8.1** Find the eigenvalues and eigenvectors of the matrix Verify that the trace equals the sum of the eigenvalues, and the determinant equals their product.

**8.2** With the same matrix solve the differential equation what are the two pure exponential solutions?

**8.3** Suppose we shift the preceding by subtracting

What are the eigenvalues and eigenvectors of and how are they related to those of

**8.4** Find the eigenvalues and eigenvectors of

and

Check that equals the trace and equals the determinant.

**8.5** Suppose that is an eigenvalue of and is its eigenvector:

(a) Show that the same is an eigenvector of and find the eigenvalue.

(b) Assuming show that is also an eigenvector of and find the eigenvalue.

**8.6** Factor the following matrices into

and

**8.7** Find the matrix whose eigenvalues are 1 and 4, and whose eigenvectors are and respectively.