**Assignment 2**

1. Take two complex number a=2+3i and b=5+4i.

i) Compute c=a/b

ii) Now do the following steps:

a) rationalize the denominator by multiplying the numerator and

b) the denominator by the conjugate of the denominator.

-----Compare the result.

2. Prove by an example that The product of a complex number and its conjugate is a real number, and is always positive.

3. Create a 3 × 3 circulant matrix using the function “gallery”. Then find the eigenvalue and eigenvector of the matrix. (use function “eig”)

4. Hermitian matrix (or self-adjoint matrix) is a square matrix with complex entries that is equal to its own conjugate transpose.

\begin{displaymath}\begin{array}{lllllllllll}
A= [ & 2 & 5+2i& 3-i;& 5-2i & 7 &...
...+i & 1-4i; & 3i & 5-i & 2+5i; 4i & -3+i & 2-7i ]
\end{array} \end{displaymath}

Find which one of A,B,C is Hermitian matrix.

5. A complex square matrix *A* is **normal** if

A\*A=AA\*

where*A*∗ is the conjugate transpose of *A*.

Find which one of A,B,C are Normal.

6. A complex square matrix *A* is **unitary** if its conjugate transpose *A*∗ is also its inverse .

A\*A=AA\*=I. I is the identity matrix.

Find which one of A,B,C are unitary.

7. A polynomial anxn+an-1xn-1 +…….+a2x2+ a1x +a0 can be represented in matrix format as

A= [an an-1 an-2 ……… a2 a1 a0]

roots(A) command is used to find the root. Take a quadratic equation in and find the roots of it using ‘roots’ command and using



and compare the results.