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| **SUDHANSHU KUMAR** | **ROLL NO. 201010** | **SECTION J9** |

**ESO 208**

**PROGRAMMING ASSIGNMENT 2**

Q1

Input :

3

4 2 0 10

2 4 1 11.5

0 1 5 4.5

Output:

1. Gauss elimination (GE; without pivoting)

X

1.500000

2.000000

0.500000

1. GE (with partial pivoting)

X

1.500000

2.000000

0.500000

1. LU decomposition by Doolittle method (without pivoting)

L

1.000000 0.000000 0.000000

0.500000 1.000000 0.000000

0.000000 0.333333 1.000000

U

4.000000 2.000000 0.000000

0.000000 3.000000 1.000000

0.000000 0.000000 4.666667

X

1.500000

2.000000

0.500000

1. LU decomposition by Crout method (without pivoting)

L

4.000000 0.000000 0.000000

2.000000 3.000000 0.000000

0.000000 1.000000 4.666667

U

1.000000 0.500000 0.000000

0.000000 1.000000 0.333333

0.000000 0.000000 1.000000

X

1.500000

2.000000

0.500000

e) Cholesky decomposition (for symmetric positive definite matrix)

L =  
  
 2.0000 0 0  
 1.0000 1.7321 0  
 0 0.5774 2.1602  
  
  
ans =  
  
 2.0000 1.0000 0  
 0 1.7321 0.5774  
 0 0 2.1602  
  
  
X =  
  
 1.5000  
 2.0000  
 0.5000

Q2)

3

8.0 -1.0 -1.0

-1.0 4.0 -2.0

-1.0 -2.0 10.0

100

0.001

8.0

**1.** Power method

Eigenvalue

10.7787

Eigenvector

-0.2509

-0.2397

0.9379

Iterations

30

**2.** Inverse power method

Eigenvalue

3.0749

Eigenvector

0.2482

0.9205

0.3017

Iterations

12

**3.**Inverse power method with shift

Eigenvalue

8.1461

Eigenvector

0.9356

-0.3085

0.1718

Iterations

6

**4.**QR method

Eigenvalues

10.7788

8.1462

3.0749

Iterations

23