

## MATLAB ASSIGNMENT-5

### SIMILARITY AND ORTHOGONAL TRANSFORMATION

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1. Diagonalize  $A = [1,6,1;1,2,0;0,0,3]$  by similarity transformation and hence find  $A^8$ .

The image shows the MATLAB R2015a - academic use interface. The Editor window displays a script for diagonalizing a matrix A. The Command Window shows the execution results, including the input matrix A, the eigenvectors P, the diagonal matrix D, and the final diagonalized matrix A^8.

```

1  clc
2  clear
3  A=input('Enter the matrix for diagonalization :');
4  [P,D]=eig(A);
5  disp('Given Matrix (A) :')
6  disp(A)
7  disp('Modal Matrix (P) :')
8  disp(P)
9  disp('Inverse of P :')
10 PI=inv(P);
11 disp(PI)
12 disp('Diagonal Matrix (D=P^(-1)*A*P):')
13 DM=round(PI*A*P, 2);
14 disp(DM)
15 disp('A^8=P^(-1)*(D^8)*P :')
16 ag=round(P*(DM^8)*PI, 2);
17 disp(ag)
  
```

Command Window Output:

```

Enter the matrix for diagonalization : [1,6,1;1,2,0;0,0,3]
Given Matrix (A) :
     1     6     1
     1     2     0
     0     0     3

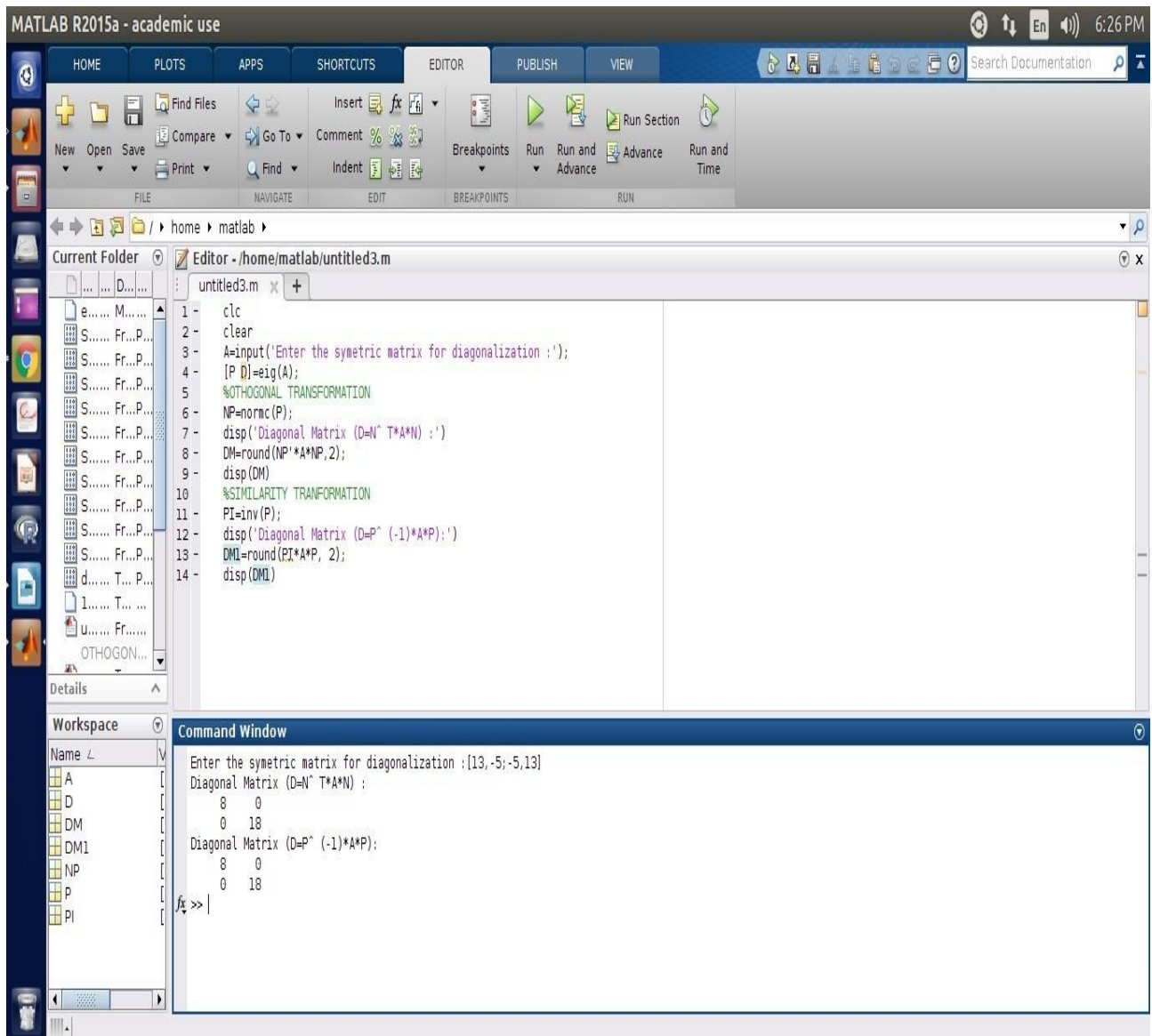
Modal Matrix (P) :
   -0.9487   -0.8944   -0.2357
    0.3162   -0.4472   -0.2357
         0         0    0.9428

Inverse of P :
   -0.6325    1.2649    0.1501
   -0.4472   -1.3416   -0.4472
         0         0    1.0607

Diagonal Matrix (D=P^(-1)*(D^8)*P):
     1     0     0
     0     4     0
     0     0     3

A^8=P^(-1)*(D^8)*P:
   26215    78642   24574
   13107    39322   11467
         0         0    6561
  
```

2.Transform the quadratic form  $13x^2 - 10xy + 13y^2$  to canonical form and specify the matrix of transformation.



3.Transform the quadratic form  $3x^2 + 5y^2 + 3z^2 - 2yz + 2zx - 2xy$  to canonical form and specify the matrix of transformation.

**Editor - /home/matlab/untitled3.m**

```

1  clc
2  clear
3  A=input('Enter the symetric matrix for diagonalization :');
4  [P D]=eig(A);
5  %OTHOOGONAL TRANSFORMATION
6  NP=normc(P);
7  disp('Diagonal Matrix (D=N^T*A*N) :')
8  DM=round(NP'*A*NP,2);
9  disp(DM)
10 %SIMILARITY TRANSFORMATION
11 PI=inv(P);
12 disp('Diagonal Matrix (D=P^* (-1)*A*P):')
13 DMI=round(PI*A*P, 2);
14 disp(DMI)

```

**Command Window**

```

Enter the symetric matrix for diagonalization :[3,-1,1;-1,5,-1;1,-1,3]
Diagonal Matrix (D=N^T*A*N) :
    2     0     0
    0     3     0
    0     0     6
Diagonal Matrix (D=P^* (-1)*A*P):
    2     0     0
    0     3     0
    0     0     6
fx >>

```

**Workspace**

Name	Size
A	3x3
D	3x3
DM	3x3
DMI	3x3
NP	3x3
P	3x3
PI	3x3

-----THANK YOU-----