

Practical 5

Aim: Compute discrete cosine transform. Program to perform KL transform for the given 2D matrix.

Code:

```
clear;
clc;
X=[4,3,5,6;4,2,7,7;5,5,6,7];
[m,n]=size(X);
A=[];
E=[]
for i=1:n
    A=A+X(:,i);
    E=E+X(:,i)*X(:,i)';
end
mx=A/n;
E=E/n;
C=E-mx*mx';
[V,D]=spec(C);
d=diag(D);
[d,i]=gsort(d);
for j=1:length(d)
    T(:,j)=V(:,i(j));
end
T=T'
disp(d,'Eigen Values are U=');
disp(T,'The eigen vector matrix T=');
disp(T,'The KL transform basis is=');
for i=1:n
    Y(:,i)=T'*X(:,i);
end
disp(Y,'KL transformation of the input matrix Y=')
```

```

for i=1:n
    x(:,i)=T*Y(:,i);
end
disp(x,'Reconstruct matrix if the given sample matrix X=')

```

Output:

Eigen Values are U=

```

6.1963372
0.2147417
0.0264211

```

The eigen vector matrix T=

```

0.4384533    0.8471005    0.3002988
0.4460381   - 0.4951684    0.7455591
- 0.7802620    0.1929481    0.5949473

```

The KL transform basis is=

```

0.4384533    0.8471005    0.3002988
0.4460381   - 0.4951684    0.7455591
- 0.7802620    0.1929481    0.5949473

```

KL transformation of the input matrix Y=

```

- 0.3633446   - 1.693874    0.6329609    0.2911522
2.3724693    2.5157054    1.9270129    2.9670615
7.1581681    5.3667511    10.290091    11.185338

```

Reconstruct matrix ipf the given sample matrix X=

```

4.    3.    5.    6.
4.    2.    7.    7.
5.    5.    6.    7.

```

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