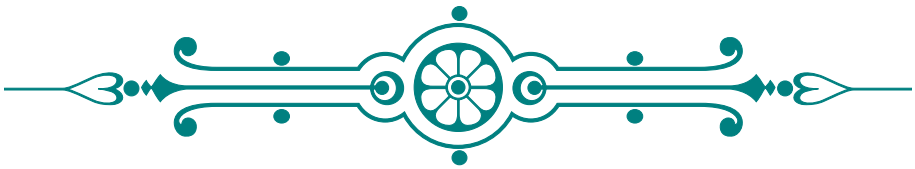

정보통신 수학 및 실습
Lab assignment

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Chapter 6 Lab Assignment

1. Create the following vectors and evaluate the equations as described below using MATLAB:

a) A row vector A whose starting point is 3 and end point is 3.9 and interval between the adjacent points is 0.1.

b) A row vector B which has 10 points between 10 and 50.

c) Compute 0.5*A

d) Compute the element by element addition of A and B.

e) Compute the element by element subtraction of A and B.

f) Compute the element by element multiplication of A and B.

g) Compute the element by element division of A by B.

```
A = [3:0.1:3.9]
B = linspace(10, 50, 10)
0.5 * A
A + B
A - B
A .* B
A ./ B
```

```
A =

 Columns 1 through 8:

    3.0000    3.1000    3.2000    3.3000    3.4000    3.5000    3.6000    3.7000

 Columns 9 and 10:

    3.8000    3.9000

B =

 Columns 1 through 8:

   10.000    14.444    18.889    23.333    27.778    32.222    36.667    41.111

 Columns 9 and 10:
```

45.556 50.000

ans =

Columns 1 through 8:

1.5000 1.5500 1.6000 1.6500 1.7000 1.7500 1.8000 1.8500

Columns 9 and 10:

1.9000 1.9500

ans =

Columns 1 through 8:

13.000 17.544 22.089 26.633 31.178 35.722 40.267 44.811

Columns 9 and 10:

49.356 53.900

ans =

Columns 1 through 8:

−7.0000 −11.3444 −15.6889 −20.0333 −24.3778 −28.7222 −33.0667 −37.4111

Columns 9 and 10:

−41.7556 −46.1000

ans =

Columns 1 through 8:

30.000 44.778 60.444 77.000 94.444 112.778 132.000 152.111

Columns 9 and 10:

173.111 195.000

```
ans =

 Columns 1 through 7:

    0.300000    0.214615    0.169412    0.141429    0.122400    0.108621    0.098182

 Columns 8 through 10:

    0.090000    0.083415    0.078000
```

2. For A = [1 2 3; 4 5 6; 1 1 3], answer the following questions:

a) Let a_{ij} be the element of ith row and jth column of A. Find a_{23}.

$$A = \begin{bmatrix} 1 & 2 & 3 \\ 4 & 5 & 6 \\ 7 & 8 & 9 \end{bmatrix}$$

$$\therefore a_{23} = 6$$

b) Find 3rd row of A.

c) Find 2nd column of A.

d) Find the transpose of A.

e) Find the number of independent rows or columns of A.

f) Find the inverse of A.

g) Find the Eigen values of A.

h) Find the Eigen vectors of A.

i) Find the sum of the diagonal elements of A.

j) Find the determinant of A.

k) Find the adjoint matrix of A and the inverse matrix of A using (j).

```
A = [1  2  3;4  5  6;1  1  3]
A(2,3)
A (3,:)
A (:,2)
rank(A)
A'
inv(A)
[vec, val] = eig(A)
```

```
trace(A)
det(A)
inv(A) * det(A)
```

```
A =

    1    2    3
    4    5    6
    1    1    3

ans =  6
ans =

    1    1    3

ans =

    2
    5
    1

ans =  3
ans =

    1    4    1
    2    5    1
    3    6    3

ans =

   -1.50000    0.50000    0.50000
    1.00000    0.00000   -1.00000
    0.16667   -0.16667    0.50000

vec =

    0.353278    0.853624   -0.063938
    0.903466   -0.511857   -0.833894
    0.242782   -0.096580    0.548209

val =
```

```
Diagonal Matrix

    8.17644         0         0
          0   -0.53868         0
          0         0    1.36225

ans =  9
ans = -6
ans =

    9.00000   -3.00000   -3.00000
   -6.00000   -0.00000    6.00000
   -1.00000    1.00000   -3.00000
```

3. Find the solution of the following linear equations.

2x-3y+z = 1

4x-y+2z=3

5x-2y+3z=-2

```
A = [2  -3 1;4  -1 2;5  -2 3]
B =  [1;3;-2]
inv(A) * B
```

```
A =

    2   -3    1
    4   -1    2
    5   -2    3

B =

    1
    3
   -2

ans =

    6.40000
    0.20000
  -11.20000
```

4. Answer the following questions. Use axis([-10 10 -10 10]) to sets the limits for the x- and y-axis of the current axes.

a) Create a point X whose coordinate is (2, 1) and plot it.

b) Find a matrix A which can rotate a point by 45 degree.

c) Plot Y=AX on top of (a).

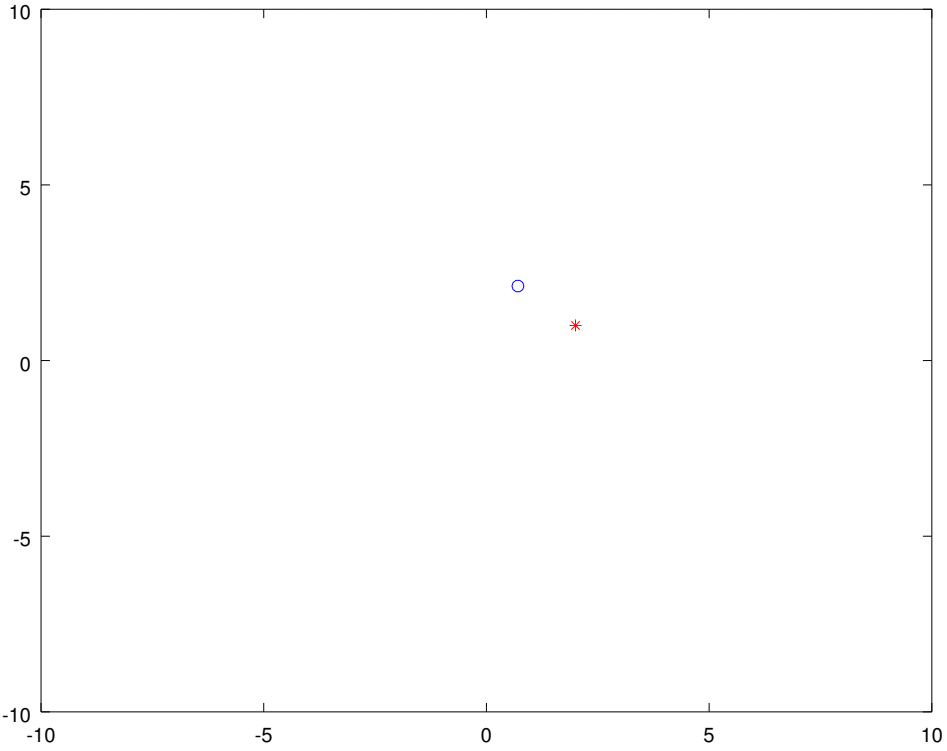
d) Find an Eigen vector of A and call it E.

e) Plot E and AE.

```
X = [2;1]
plot(X(1,1),X(2,1),'r*'),axis([-10 10 -10 10])
A = [cos(pi/4) -sin(pi/4);sin(pi/4) cos(pi/4)]
hold on
Y = A * X
plot(Y(1,1),Y(2,1),'bo')
[vec, val] = eig(A)
print -depsc 4.eps
```

```
X =

    2
    1

A =

    0.70711   -0.70711
    0.70711    0.70711

Y =

    0.70711
    2.12132

vec =

    0.70711 + 0.00000i    0.70711 - 0.00000i
    0.00000 - 0.70711i    0.00000 + 0.70711i

val =

Diagonal Matrix
```

```
   0.70711 + 0.70711i                  0
                   0   0.70711 - 0.70711i
```



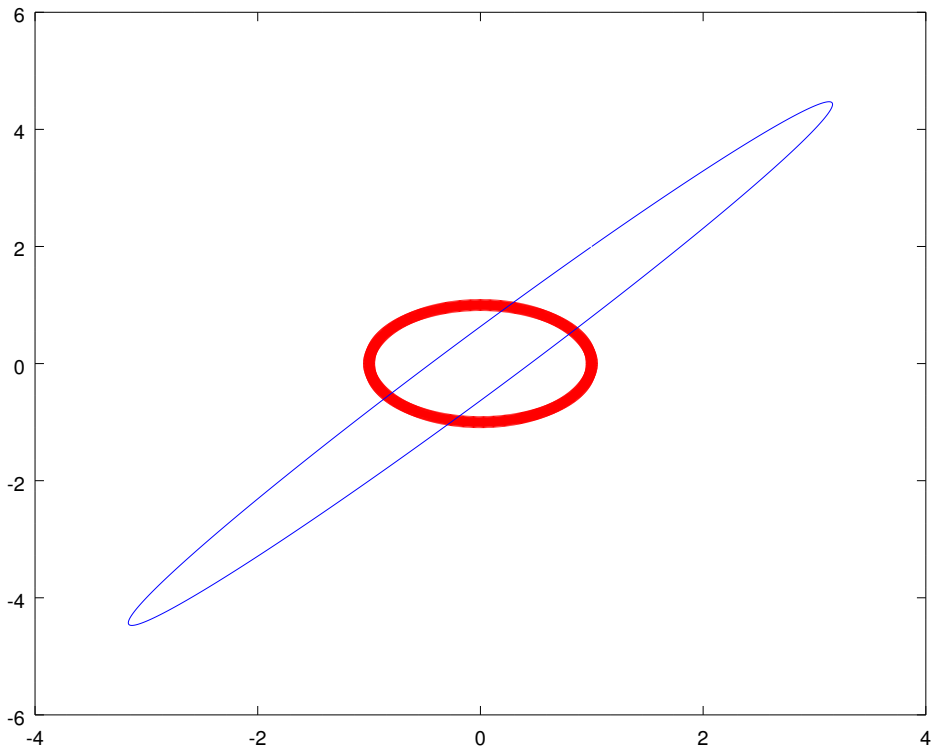
5. Let t=[0:0.01:2*pi], x=exp(j*t), and B=[1 3; 2 4]. Answer the following questions.

a) Plot the trajectory of x on a 2-dimensional plane. Use plot(real(x), imag(x), '-r*').

b) Find the matrix cx whose first row is real(x) and whose second row is imag(x). cx is the set of points

c) Compute z=B*cx. z is the linear transformation of x by matrix B. And plot z using plot(z(1,:), z(2,:)) over the plot (a).

```
t = [0:0.01:2* pi];
x = exp(j * t);
B = [1 3;2 4]
plot(real(x), imag(x), '-r*')
cx = [real(x); imag(x)];
z = B * cx;
hold on
plot(z (1,:) , z (2,:) )
```


6
4
2
0
-2
-4
-6
-4
-2
0
2
4