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## Lab 1

### Introduction to MATLAB for Control system

#### Objective:

Analysis of the MATLAB and its use for the control systems.

#### Overview:

MATLAB is a professional software used for technical computing. MATLAB stands for Matrix Laboratory. In this lab manual we are using some of the basic commands and learn how to use the control system in this software. Previously we have done use this software for data structures and it contains the built-in debugging tools and editing. It is an outstanding tool software for the engineering students.

#### Exercise 1:

Use Matlab command to obtain the following

- a) Extract the fourth row of the matrix generated by magic (6).
- b) Show the results of 'x' multiply by 'y' and 'y' divides by 'x'.  
Given  $x = [0:0.1:1.1]$  and  $y = [10:21]$
- c) Generate random matrix 'r' of size 4 by 5 with number varying between -8 and 9

#### Output (a):

```

Command Window
>> a=magic(6)

a =

    35     1     6    26    19    24
     3    32     7    21    23    25
    31     9     2    22    27    20
     8    28    33    17    10    15
    30     5    34    12    14    16
     4    36    29    13    18    11

>> a(4,:)

ans =

     8    28    33    17    10    15

fx >> |

```

### Output (b):

```
Command Window
>> x = [0:0.1:1.1]

x =

Columns 1 through 8
    0    0.1000    0.2000    0.3000    0.4000    0.5000    0.6000    0.7000

Columns 9 through 12
    0.8000    0.9000    1.0000    1.1000

>> y = [10:21]

y =

    10    11    12    13    14    15    16    17    18    19    20    21

>> z=x.*y

z =

Columns 1 through 8
    0    1.1000    2.4000    3.9000    5.6000    7.5000    9.6000    11.9000

Columns 9 through 12
    14.4000    17.1000    20.0000    23.1000

fx >> |
```

### Output (c):

```
Command Window
>> r=randi([-8,9],4,5)

r =

    -1    -6    -7    -8     5
    -4     8    -4    -8     3
    -1     9    -2    -5     0
    -7     2     6     3     1

fx >> |
```

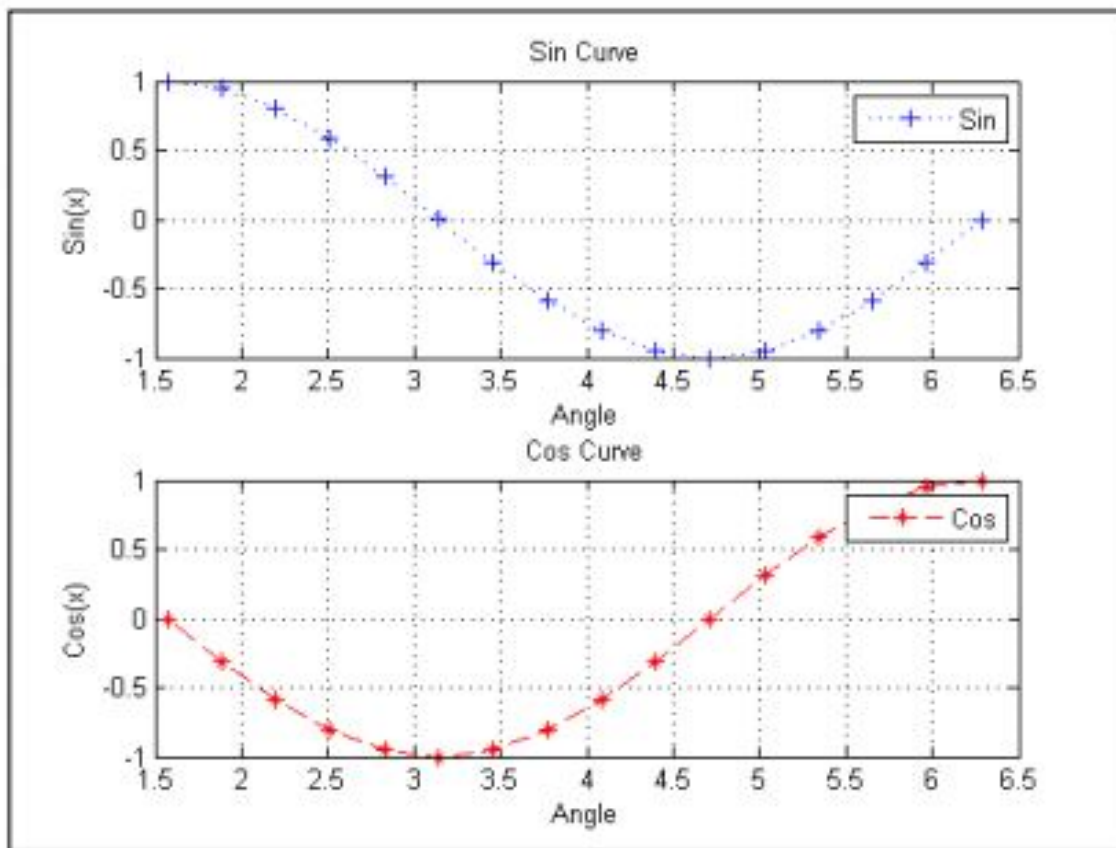
## **Exercise 2:**

Use MATLAB commands to get exactly as the figure shown below

$x = \pi/2 : \pi/10 : 2\pi;$

$y = \sin(x);$

$z = \cos(x);$



## Output:

### Command Window

```
>> x = pi/2 : pi/10 : 2*pi;  
>> y = sin(x);  
>> z = cos(x);  
>> subplot(2,1,1),plot(x,y,':b+');  
>> title('Sin Curve');  
>> xlabel('Angle');  
>> ylabel('Sin(x)');  
>> legend('Sin');  
>> grid on;  
>> subplot(2,1,2),plot(x,z,':r+');  
>> title('Cos Curve');  
>> xlabel('Angle');  
>> ylabel('Cos(x)');  
>> legend('Cos');  
>> grid on;  
fx >> |
```

