Matlab Functions

Lab 1

Note: In Matlab, you can find help document by typing “help” followed by the command name. For example: “help find” returns detailed explanation on how to use find function.

**find**  Find indices of nonzero elements.

I = find(X) returns the linear indices corresponding to the nonzero entries of the array X. X may be a logical expression.

Example:

```matlab
>> x = [1 2 3 0 9 8 0 3 9];
>> i = find(x)
i =
    1    2    3    5    6    8    9
>> x(i)
ans =
    1    2    3    9    8    3    9
>> j = find(x>3)
j =
    5    6    9
>> x(j)
ans =
    9    8    9
```

**mean**  Average or mean value.

For vectors, mean(X) is the mean value of the elements in X. For matrices, mean(X) is a row vector containing the mean value of each column. For N-D arrays, mean(X) is the mean value of the elements along the first non-singleton dimension of X.

Example:

```matlab
>> x = 0:10
x =
    0    1    2    3    4    5    6    7    8    9    10
>> mean(x)
ans =
    5
```

```
plot  Linear plot.

plot(X,Y) plots vector Y versus vector X. If X or Y is a matrix, then the vector is plotted versus the rows or columns of the matrix, whichever line up. If X is a scalar and Y is a vector, disconnected line objects are created and plotted as discrete points vertically at X.

plot(Y) plots the columns of Y versus their index.
If Y is complex, plot(Y) is equivalent to plot(real(Y),imag(Y)).
In all other uses of plot, the imaginary part is ignored.

Various line types, plot symbols and colors may be obtained with plot(X,Y,S) where S is a character string made from one element from any or all the following 3 columns:

b   blue   .   point   -   solid
g   green  o   circle  :   dotted
r   red    x   x-mark  -.  dashdot
c   cyan   +   plus    --  dashed
m   magenta *   star   (none)  no line
y   yellow s   square
k   black  d   diamond
w   white  v   triangle (down)
    ^   triangle (up)
    <   triangle (left)
    >   triangle (right)
p   pentagram
h   hexagram

```
>> x = 1:10
   x =
   1   2   3   4   5   6   7   8   9   10
>> y = 2*x
   y =
   2   4   6   8  10  12  14  16  18  20
>> plot(x,y)
```
>> plot(x, y, 'bx')
>>
**legend** Display legend.

`legend(string1,string2,string3, ...)` puts a legend on the current plot using the specified strings as labels. `legend` works on line graphs, bar graphs, pie graphs, ribbon plots, etc. You can label any solid-colored patch or surface object. The fontsize and fontname for the legend strings matches the axes fontsize and fontname.

**xlabel** X-axis label.

`xlabel('text')` adds text beside the X-axis on the current axis.

**ylabel** Y-axis label.

`ylabel('text')` adds text beside the Y-axis on the current axis.

**title** Graph title.

`title('text')` adds text at the top of the current axis.

Example

```matlab
>> x = 0:10
x =
     0     1     2     3     4     5     6     7     8     9     10
>> y = 2*x
y =
     0     2     4     6     8    10    12    14    16    18    20
>> z = 5*x
z =
     0     5    10    15    20    25    30    35    40    45    50
>> plot(x,y,'bx',x,z,'ro')
>> legend('cylinder 1','cylinder 2')
>> title('Velocity vs Time')
>> xlabel('time[s]')
>> ylabel('velocity[m/s]')
>>
```