MATLAB COMMANDS

NOTE: MATLAB IS CASE SENSITIVE. All Matlab commands are lowercase!

PLOTING COMMANDS

```
figure
figure(fig_number);
plot(t,x(:,col_num),'--r');
xlabel('text');
ylabel('text');
subplot(n,m,l);
hold on
hold off
title('text);
grid
legend('plot one','plot two');
text(x_location,y_locatin,'text');
```

IF THEN

```
if (a>b)
        stuff;
elseif(a<=b)
        stuff;
else
        stuff;
end
```

FOR

```
for k=1:1000
        t(k)=k;
end
```

POLYNOMIALS

```
my_roots=[3+4i  3-4i 10  0];
the_poly=poly(my_roots);
the_rooots=roots(the_poly);
```

USEFUL FUNCTIONS

sin, cos, tan, asin,acos,atan,atan2
size, mod, randn, length
global (generally a bad idea when programming!)
who, whos, clear, clear all
ones, zeros, eye

LOADING and SAVING DATA

```
save data_file_name  data_1 data_2 data_3
        (saves as matlab data file "data_file_name.mat")

load data_file_name
        (loads data_1, data_2 and data_3 from data_file_name.mat)

data=[data_1 data_2 data_3];
save data_file_name.txt data –ascii

load data_file_name.txt                 (loads data into variable data_file_name)
data=load('data_file_name.txt')                 (if data file is in current directory)
data=load('/home/user/classes/mech4420/mech4420_data/data_file_name.txt');

data_1=data(:,1);
data_2=data(:,2);
data_3=data(:,3)
```

MATRIX/VECTOR MANIPULATION

```
A=[3 4 5;1 2 3];
A2=[3 4 5
      1 2 3];
B=A';

a=[ones(10,1) zeros(10,1) ones(10,1)];
b=[a(1,1) a(1,3) ; a(5,1) a(5,3) ; a(10,1) a(10,3)];
b2=[ a(1,1) a(1,3)
        a(5,1) a(5,3)
        a(10,1) a(10,3)];

c=[a(:,1) ; a(1,:)'];
d=[a(1,:)  a(:,1)'];

e=[a(:,1)  a(:,3)];
f=[a(:,1) ; a(:,3)];

g=5*ones(length(a));
h=[d(1:2) d(5:6)];
```

EXAMPLE MATLAB SCRIPT (my_script.m):

```
a=1.2;          % length from CG to front axle
b=1.5;          % length from CG to rear axle

L=a+b;          % wheel base length
TM=1500;        % Total mass of car in Kg

mf=TM*b/L;  % Mass on the front axle
mr=TM*a/L;  % Mass on the rear axle
```

to run:

```
>> my_script
```

MATLAB FUNCTIONS

(First line of m-file titled "my_function_name.m"):

```
function [y]=my_fuction_name(x)
```

Example Matlab Function (calc_axle_mass.m):

```
function [mass_front_axle,mass_rear_axle]=calc_axle_mass(a,b,TM)

% [mf,rf]=calc_axle_mass(a,b,TM)
% function returns the front and rear axle masses (mf & mr)
% in Kg
% a=length from CG to front axle (in meters)
% b=length from CG to rear axle (in meters)
% TM=total mass of the car (in Kg)

L=a+b;          % wheel base length

mass_front_axle=TM*b/L;     % Mass on the front axle
mass_rear_axle=TM*a/L;      % Mass on the rear axle
```

to run:

```
>> help calc_axle_mass
>> M_car=1500;
>> [mf,mr]=calc_axle_mass(1.2,1.5,M_car)
```