

LAB PRACTICAL FILE:

Name: Manan Madan

Roll No: 2018UIC3087

List of Experiments

- 1. State Space and Transfer Function**
- 2. Pole Placement**
- 3. Cruise Control**
- 4. DC Motor**
- 5. Frequency Design**

STATE SPACE AND TRANSFER FUNCTION :

1.

The image shows the MATLAB R2018b interface. The main editor window displays a script named `expl.m` with the following code:

```
1 num = [10 10];  
2 den = [1 6 5 10];  
3 [A,B,C,D] = tf2ss(num,den);  
4 A  
5 B  
6 C  
7 D
```

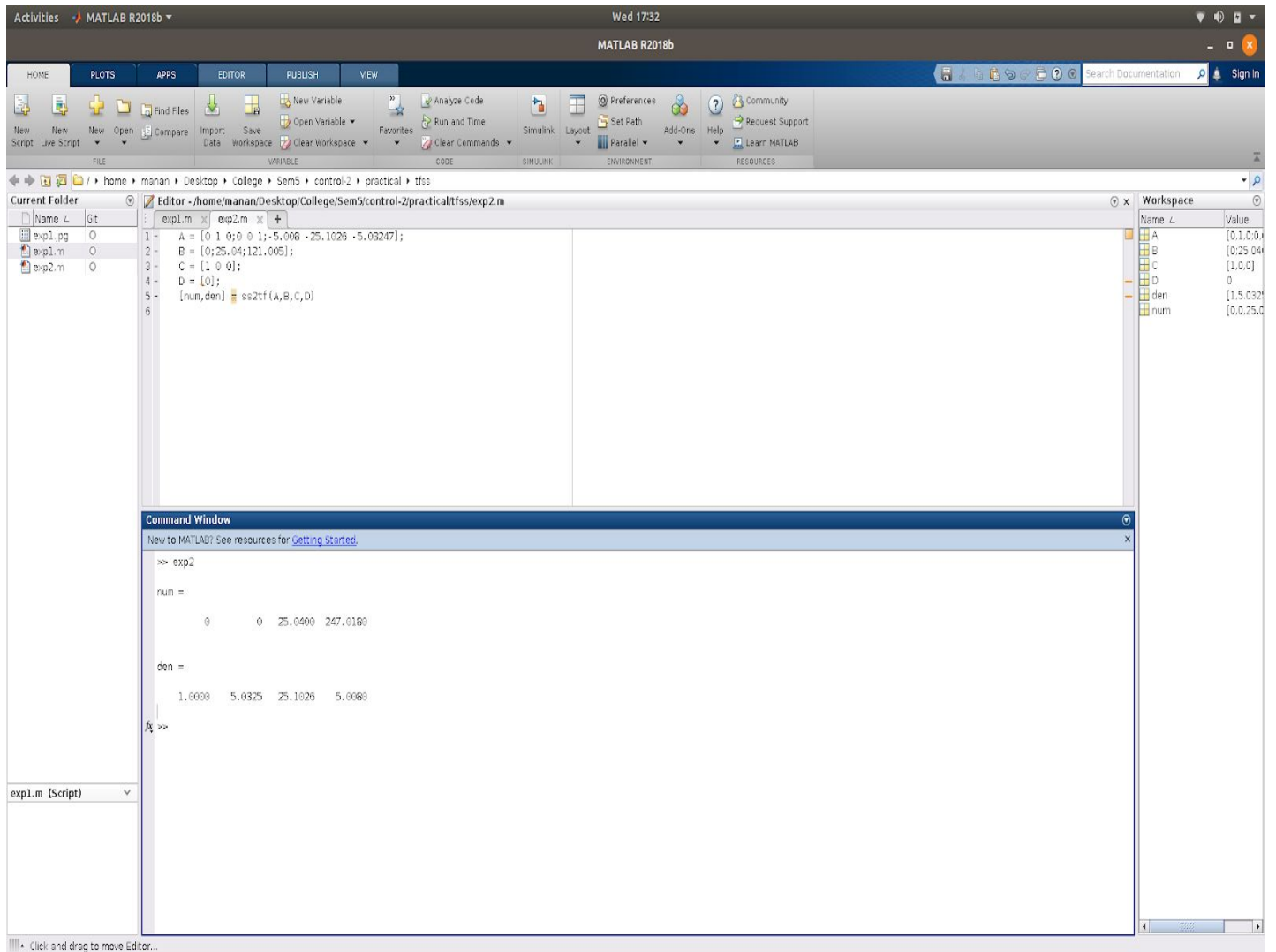
The Command Window shows the output of the script:

```
>> expl  
  
A =  
  
    -6    -5   -10  
     1     0     0  
     0     1     0  
  
B =  
  
     1  
     0  
     0  
  
C =  
  
     0    10    10  
  
D =  
  
     0  
  
fs >>
```

The Workspace window shows the following variables:

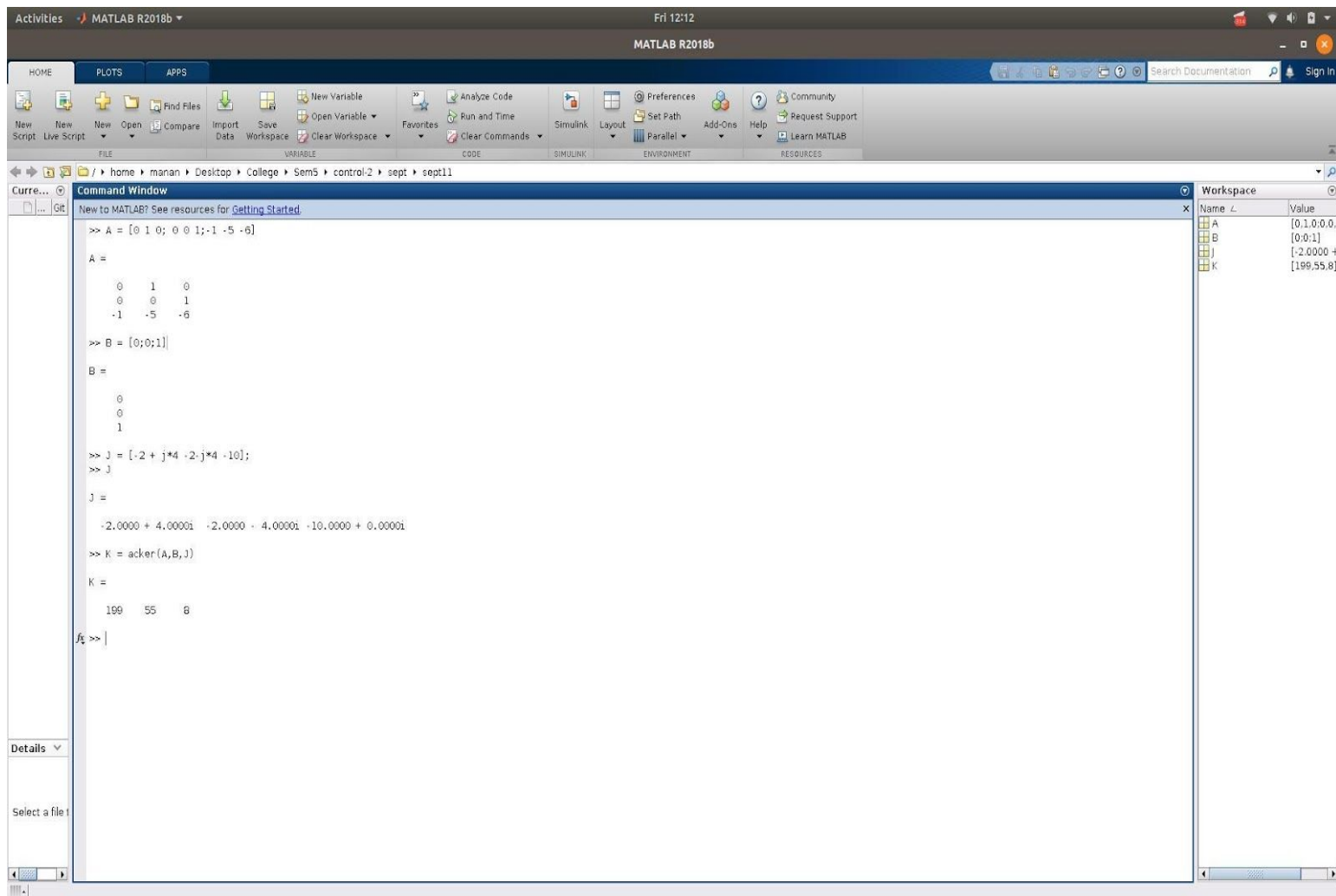
Name	Value
A	$\begin{bmatrix} -6 & -5 & -10 \\ 1 & 0 & 0 \\ 0 & 1 & 0 \end{bmatrix}$
ans	1
B	$\begin{bmatrix} 1 \\ 0 \\ 0 \end{bmatrix}$
C	$\begin{bmatrix} 0 & 10 & 10 \end{bmatrix}$
D	0
den	$[1 \ 6 \ 5 \ 10]$
num	$[10 \ 10]$

2.



POLE PLACEMENT:

1.



The screenshot shows the MATLAB R2018b interface. The Command Window displays the following code and results:

```
>> A = [0 1 0; 0 0 1; -1 -5 -6]

A =

     0     1     0
     0     0     1
    -1    -5    -6

>> B = [0;0;1]

B =

     0
     0
     1

>> J = [-2 + j*4 -2-j*4 -10];
>> J

J =

   -2.0000 + 4.0000i   -2.0000 - 4.0000i  -10.0000 + 0.0000i

>> K = acker(A,B,J)

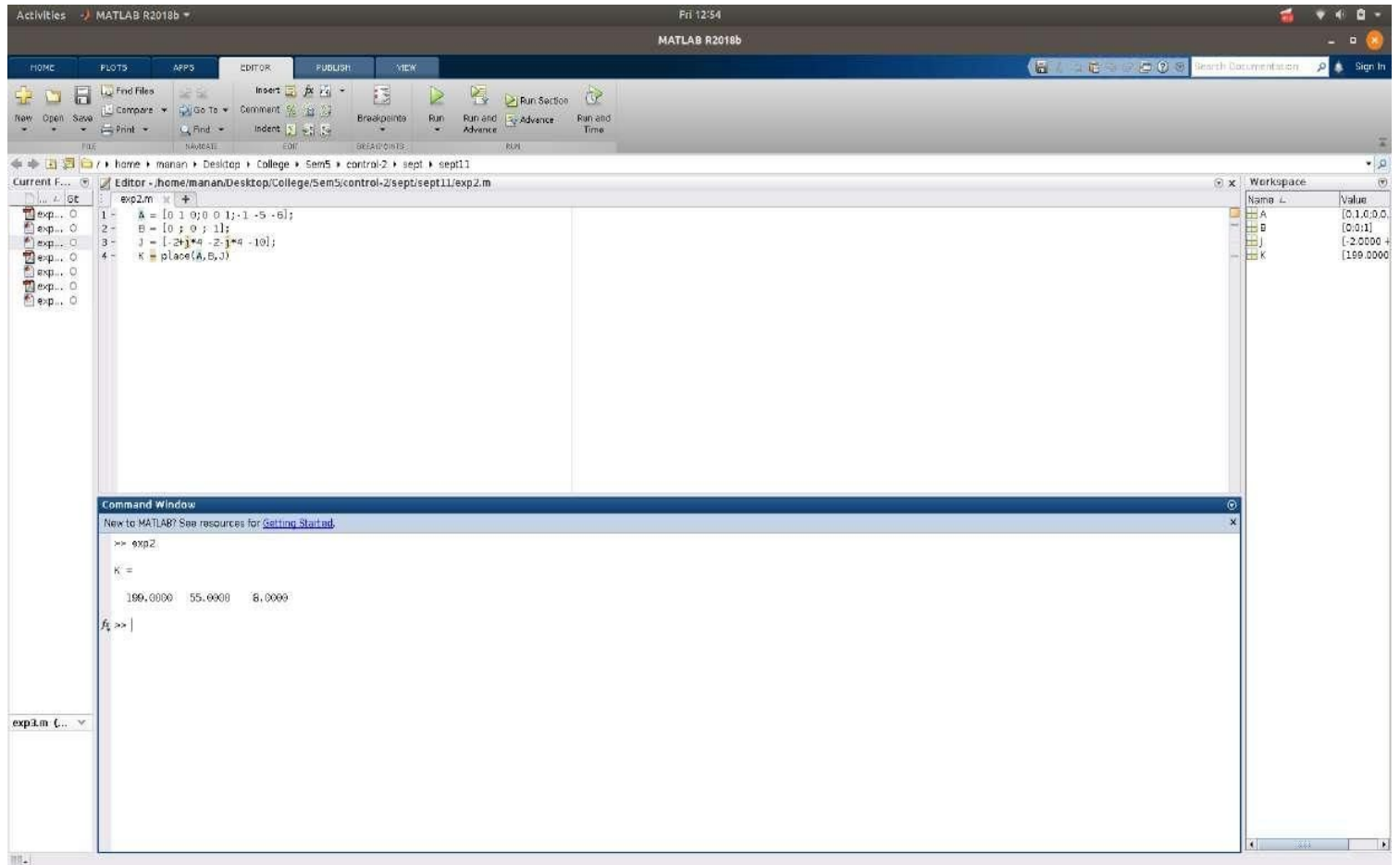
K =

    199    55     8
```

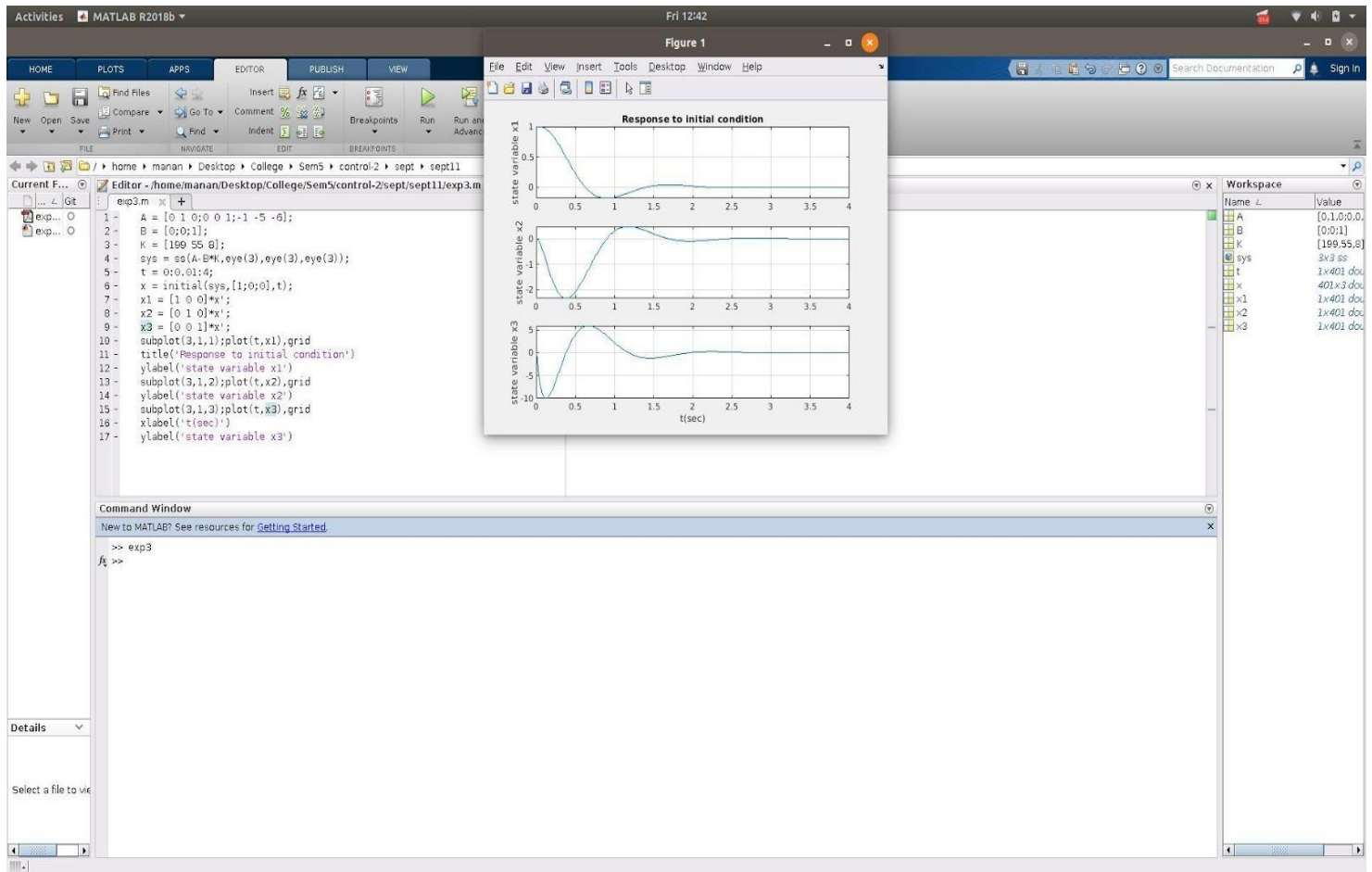
The Workspace window shows the following variables:

Name	Value
A	[0 1 0; 0 0 1; -1 -5 -6]
B	[0; 0; 1]
J	[-2.0000 + 4.0000i; -2.0000 - 4.0000i; -10.0000 + 0.0000i]
K	[199 55 8]

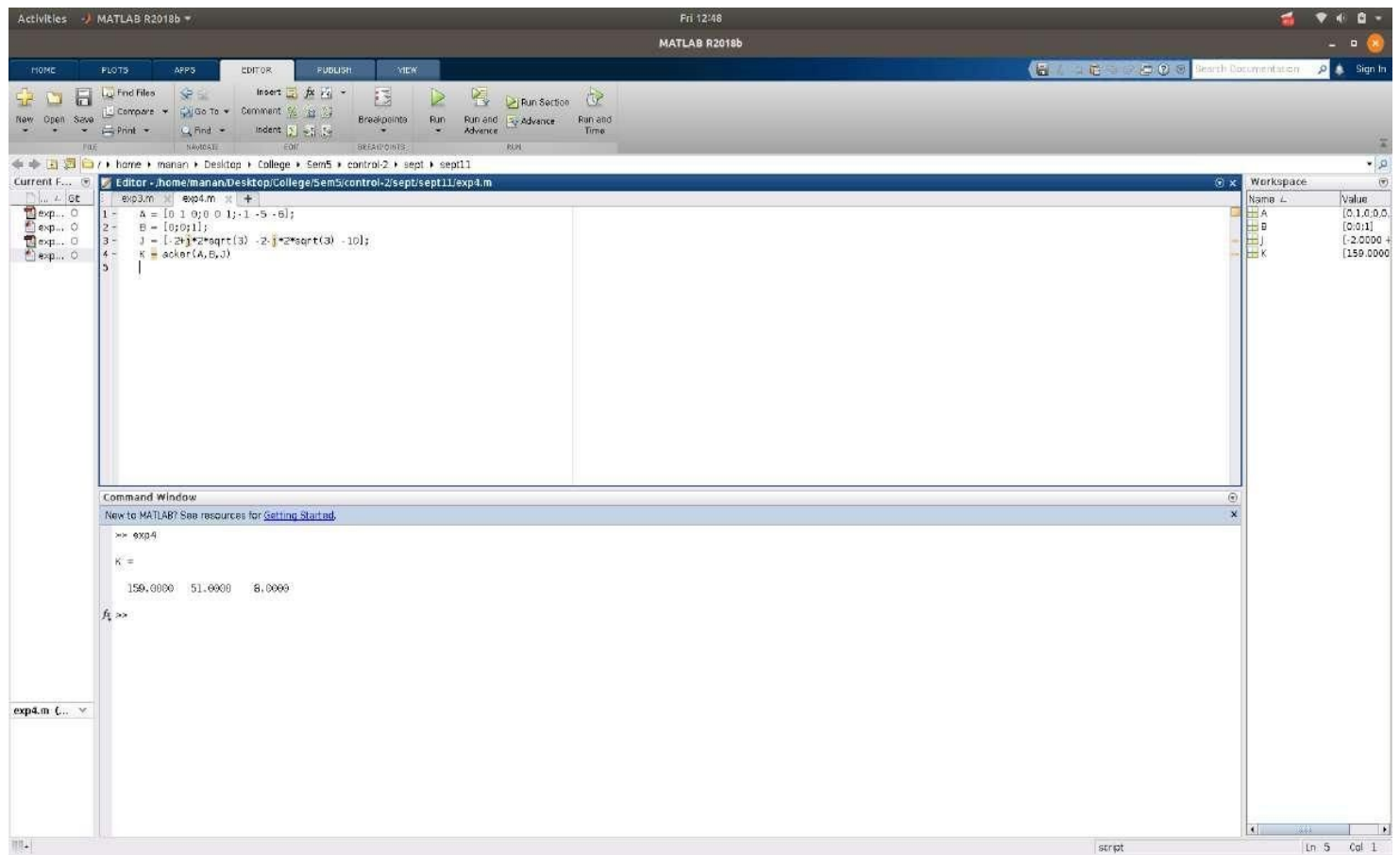
2.



3.

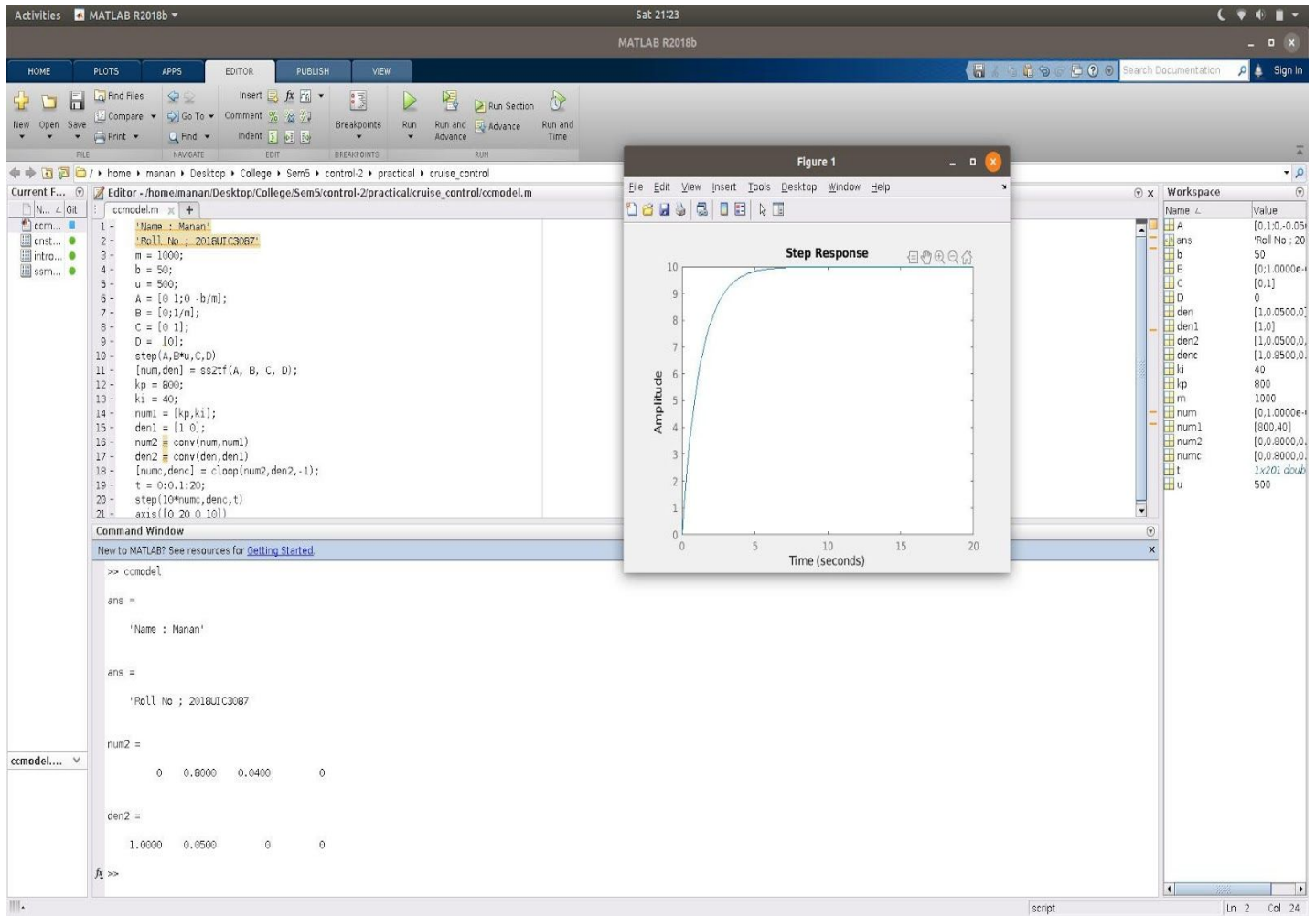


4.

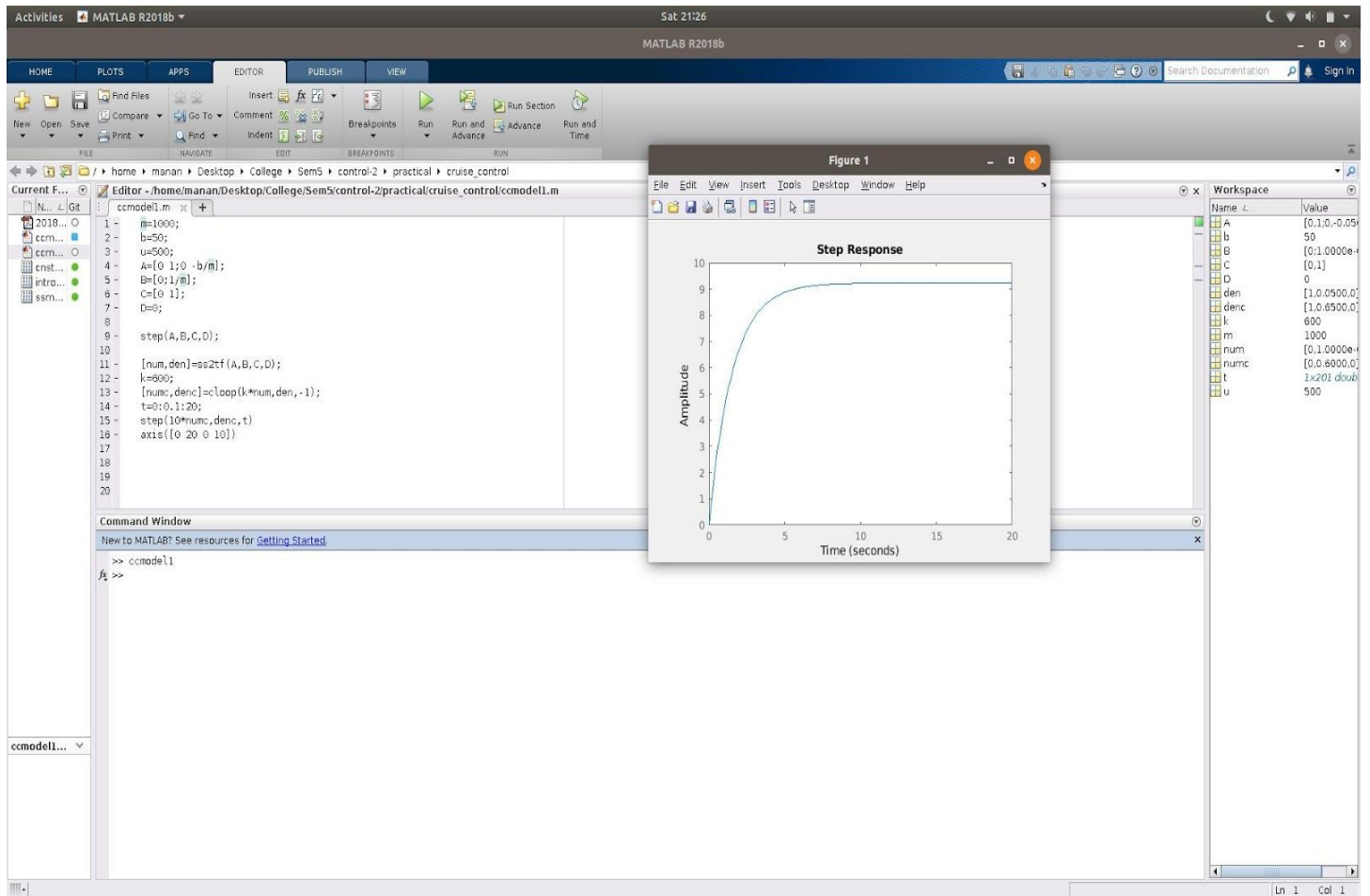


CRUISE CONTROL:

1.

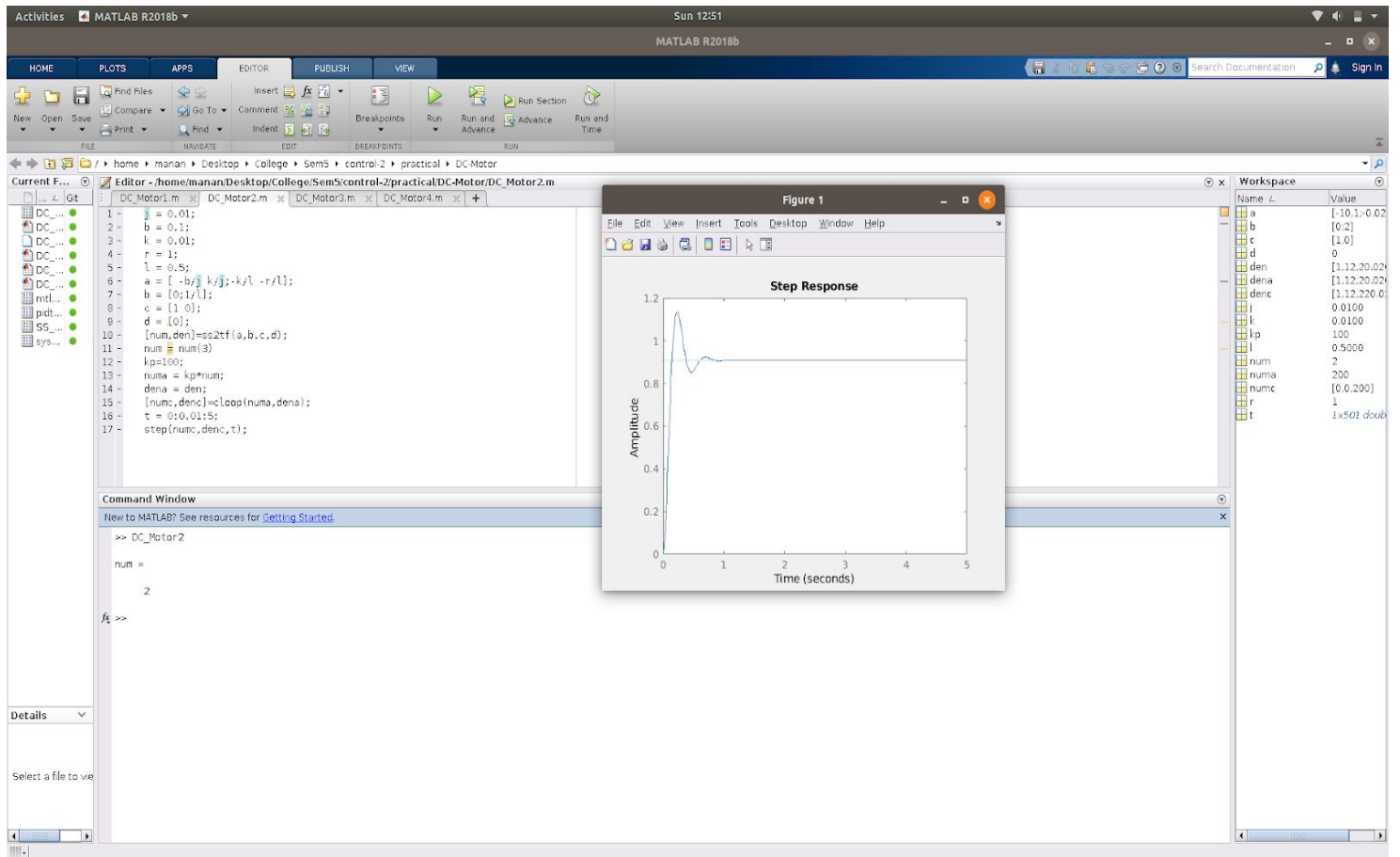


2.

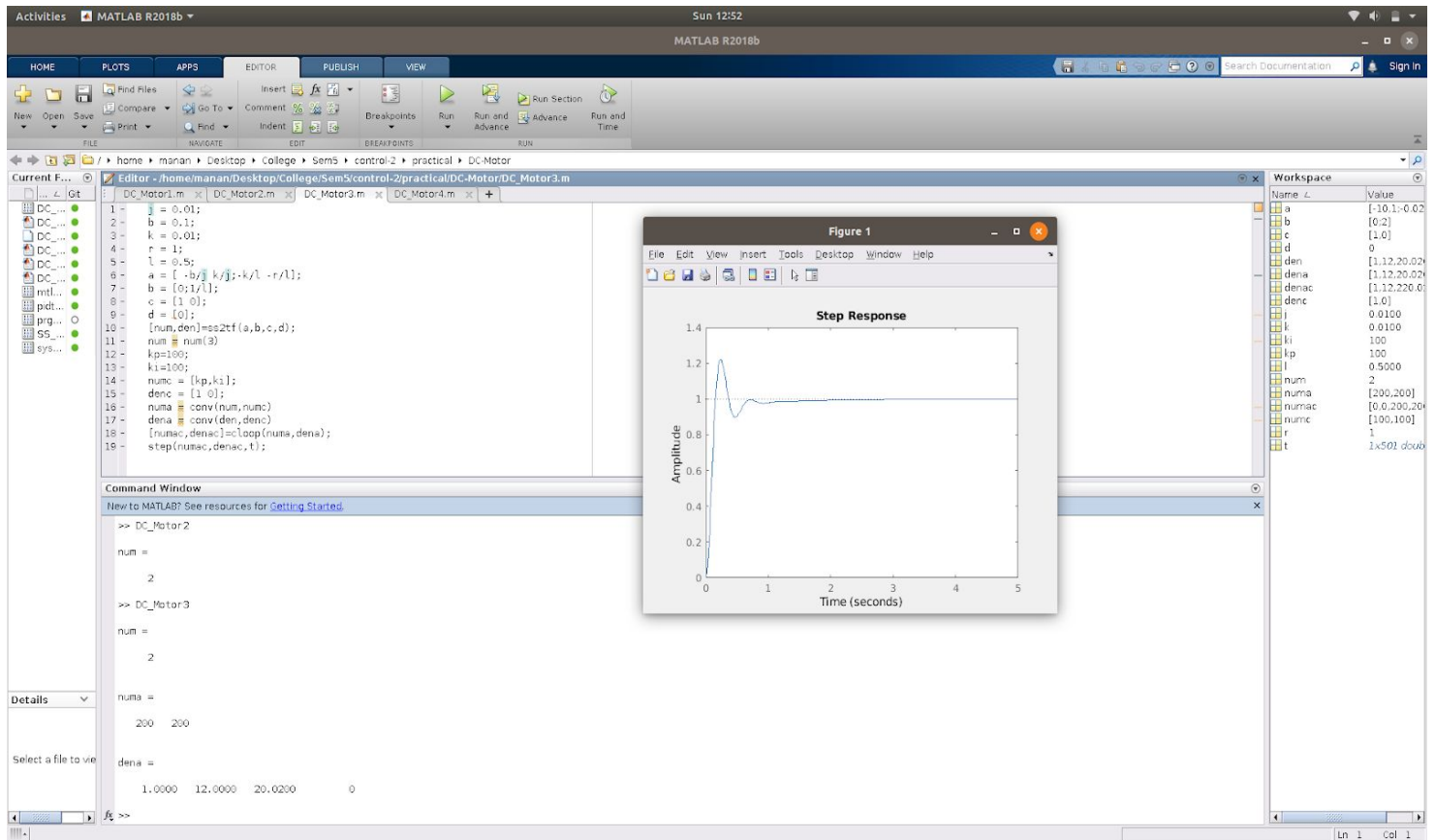


DC MOTOR:

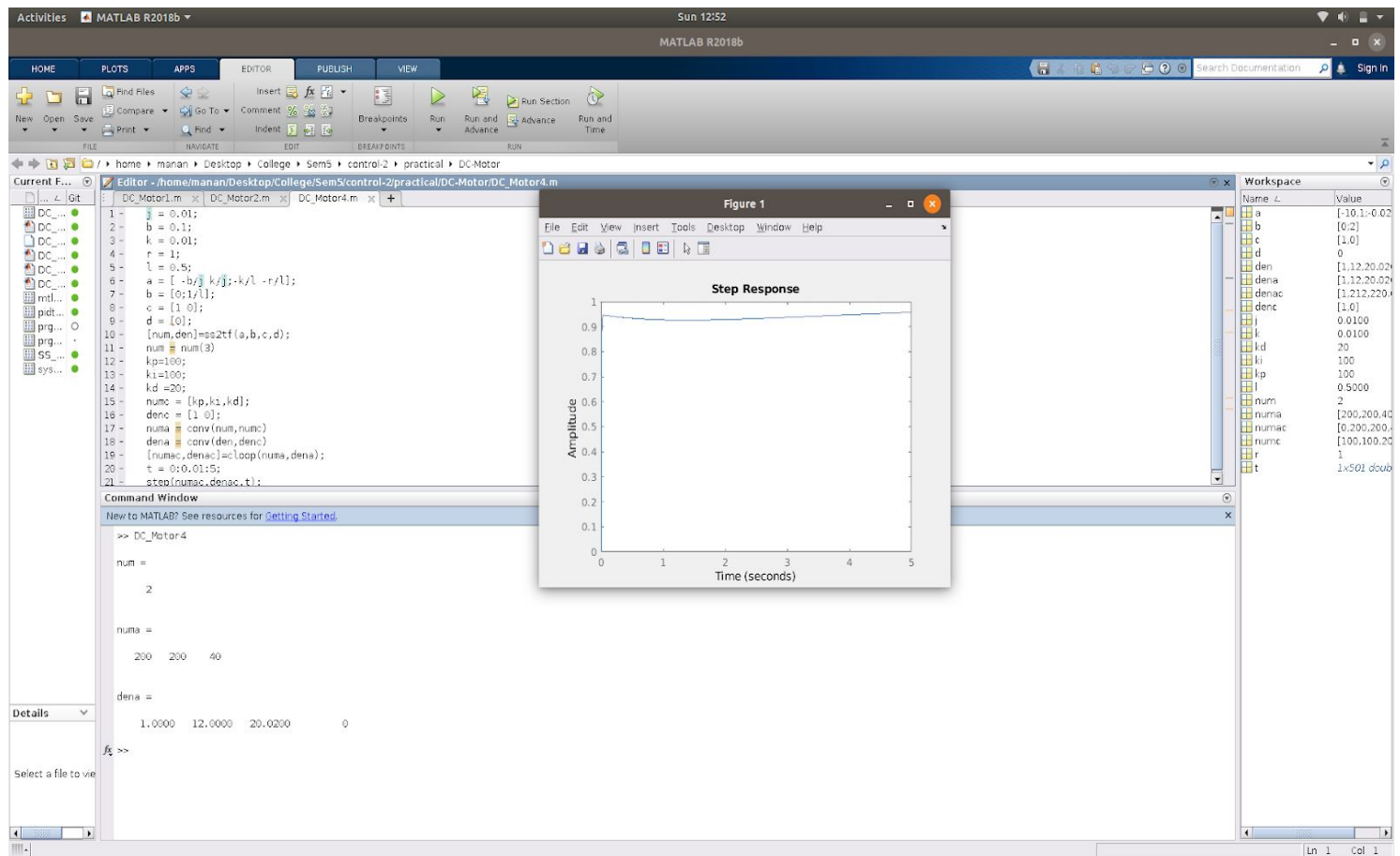
1.



2.

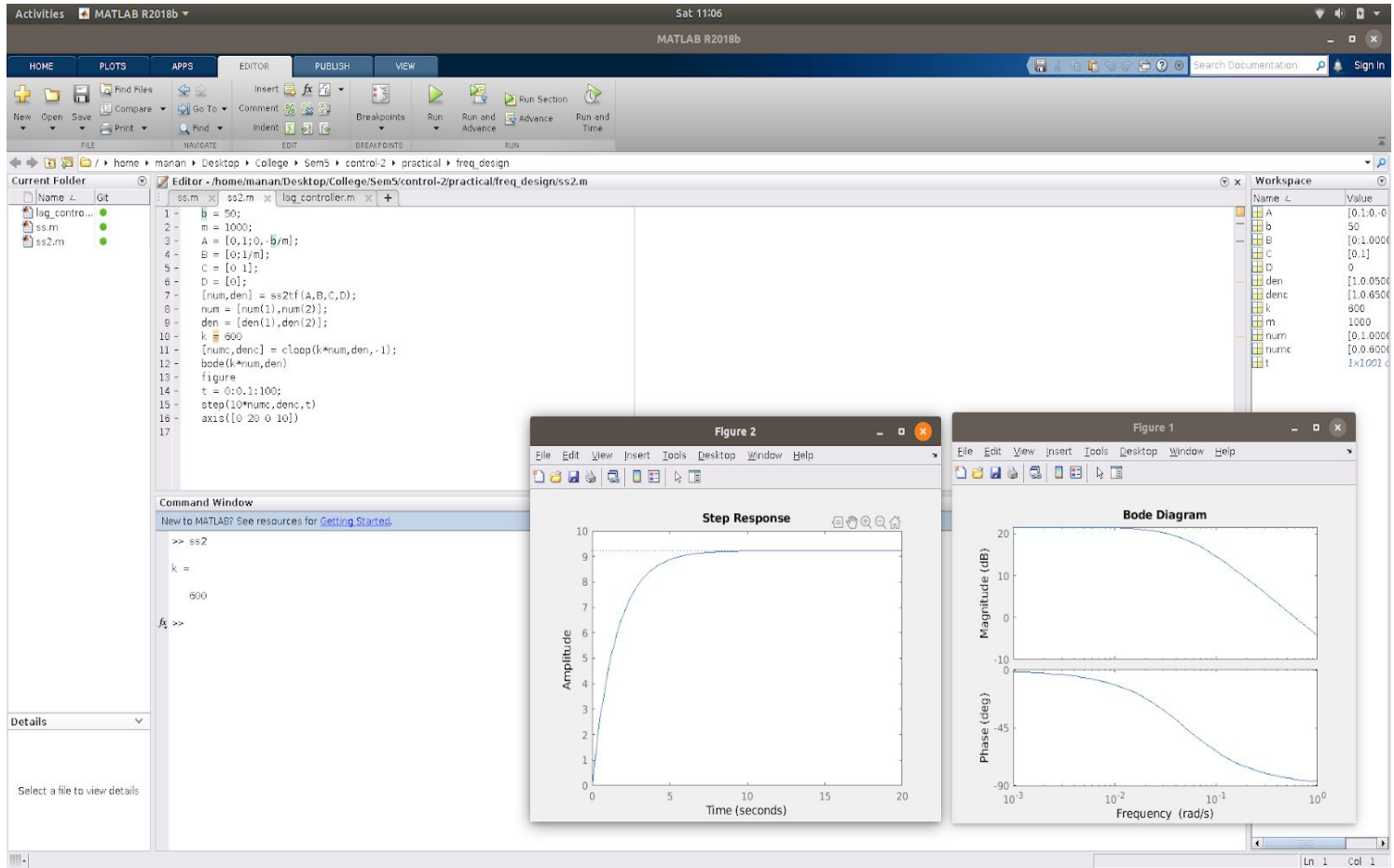


3.



FREQUENCY DESIGN:

1.



2.

