UNIVERSITÉ Concordia UNIVERSITY

MECH 370 Lab 1

Lab demonstrator: Qiaomeng Qin

Email address: q_qiaome@live.concordia.ca

Requirements

- **Attendance is mandatory**

  Do not be late

- **Reports:** submit on the Moodle, printed report is not required

  Deadline is in two weeks.

Contact

- Submit questions to Github:

https://github.com/AreteQin/MECH370.git

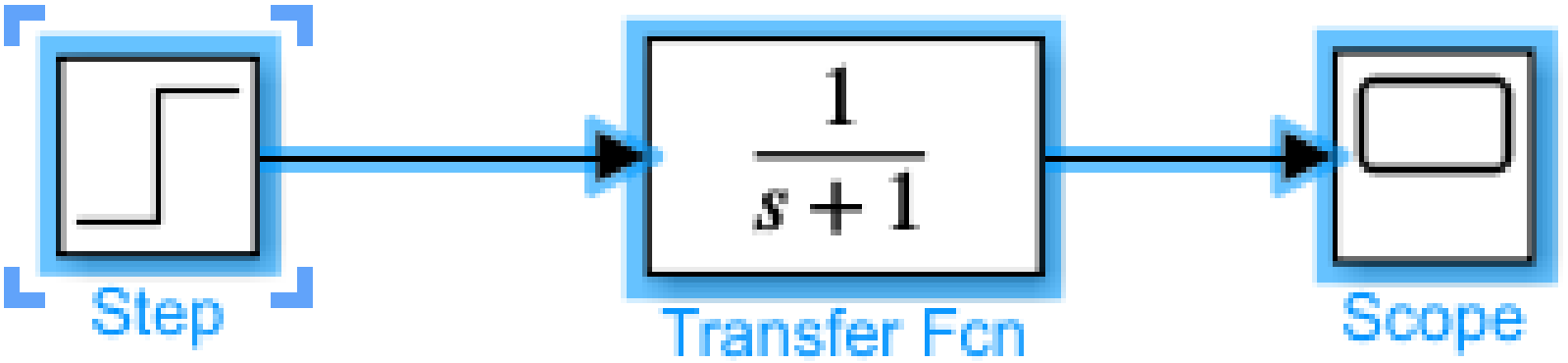
- Emails are only for personal purpose.

Purpose

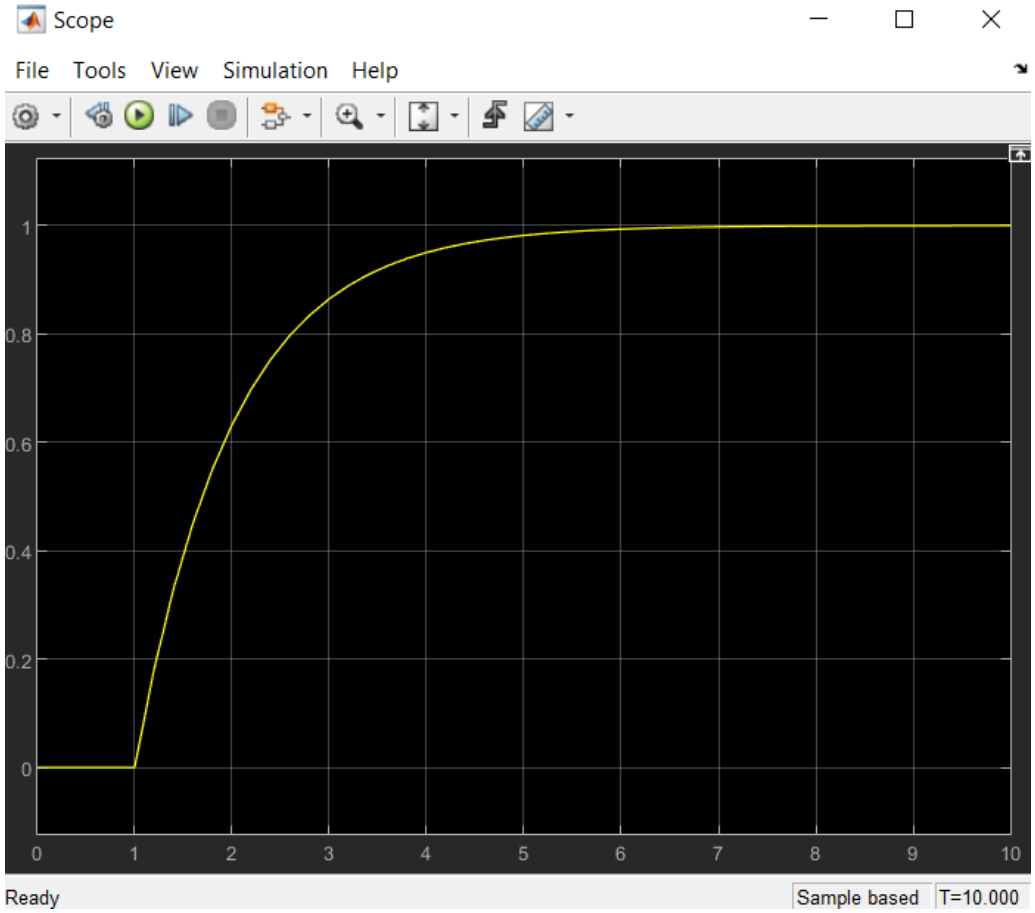
Learning the basic usage of:

- Matlab programming language
- Simulink
- Simscape

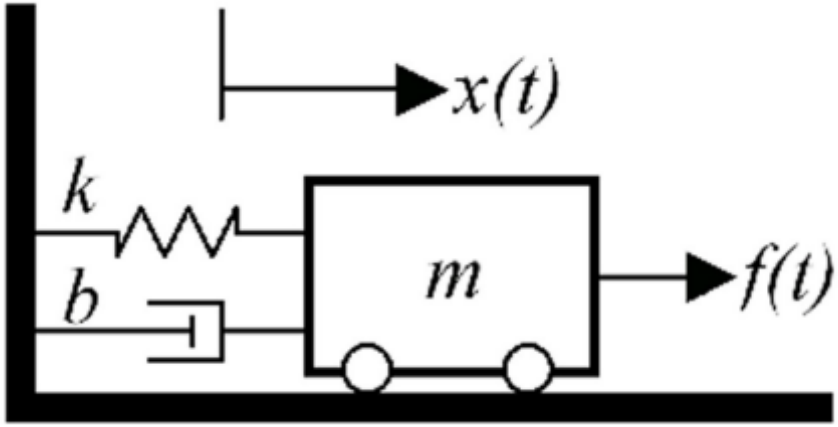
How to use Simulink



How to use Simulink



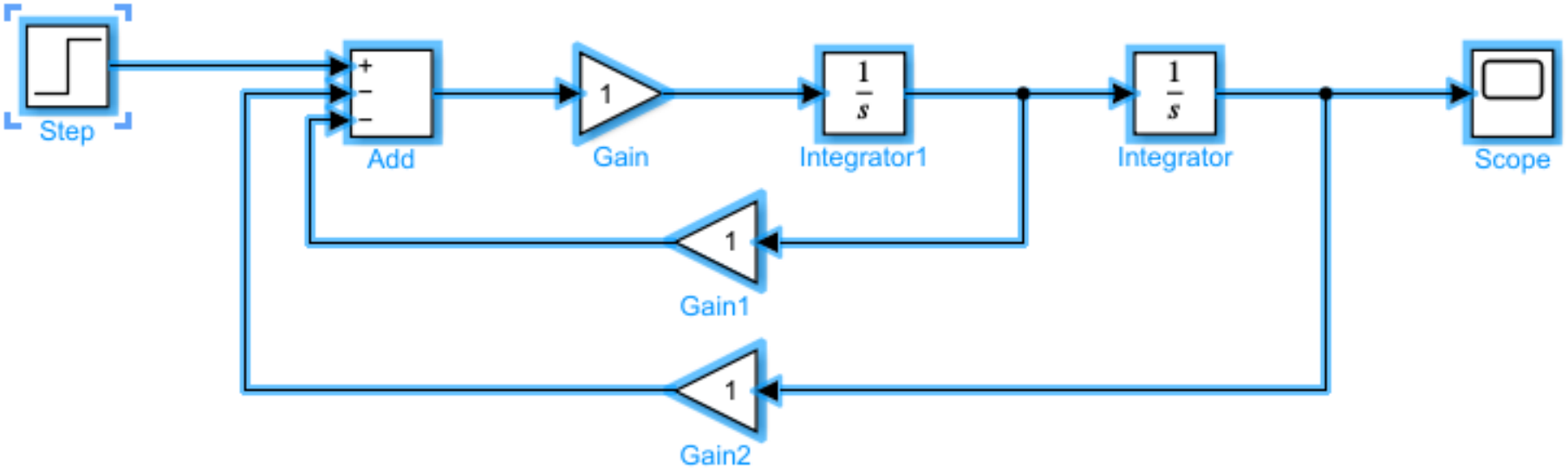
SIMULATE A SYSTEM USE SIMULINK



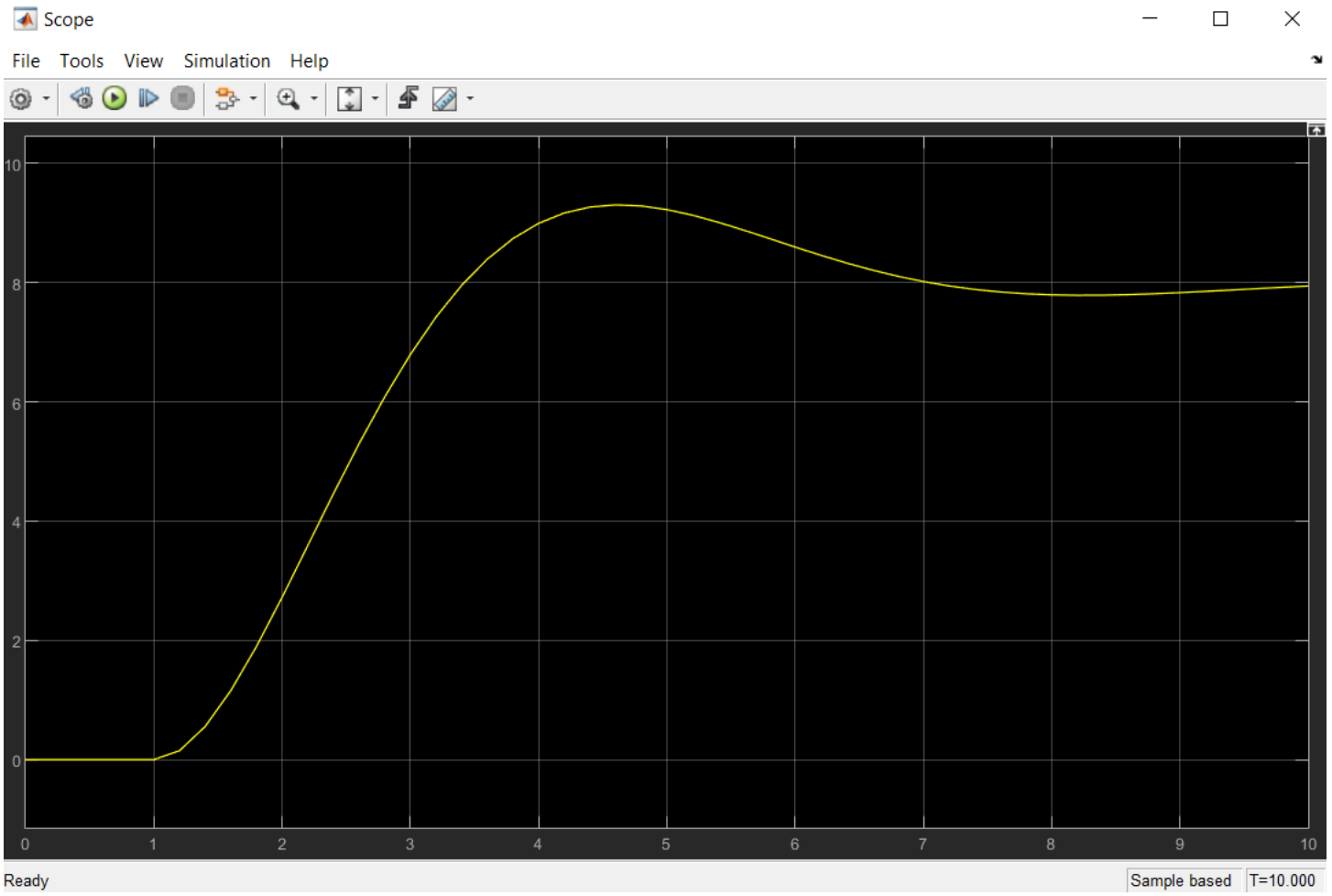
$$M\ddot{x} + B\dot{x} + Kx = f(t)$$

$$\ddot{x} = \frac{1}{M}[f(t) - B\dot{x} - Kx]$$

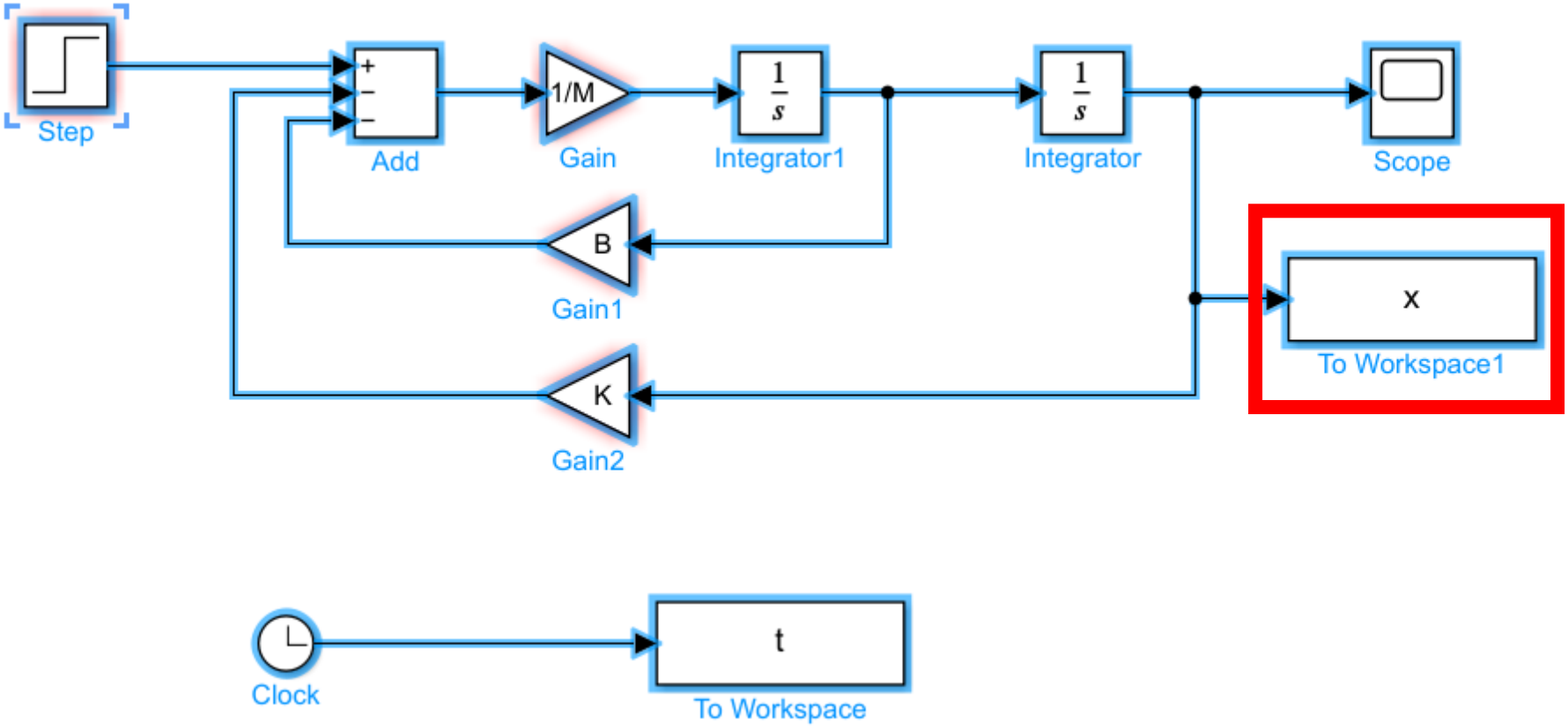
SIMULATE A SYSTEM USE SIMULINK



SIMULATE A SYSTEM USE SIMULINK



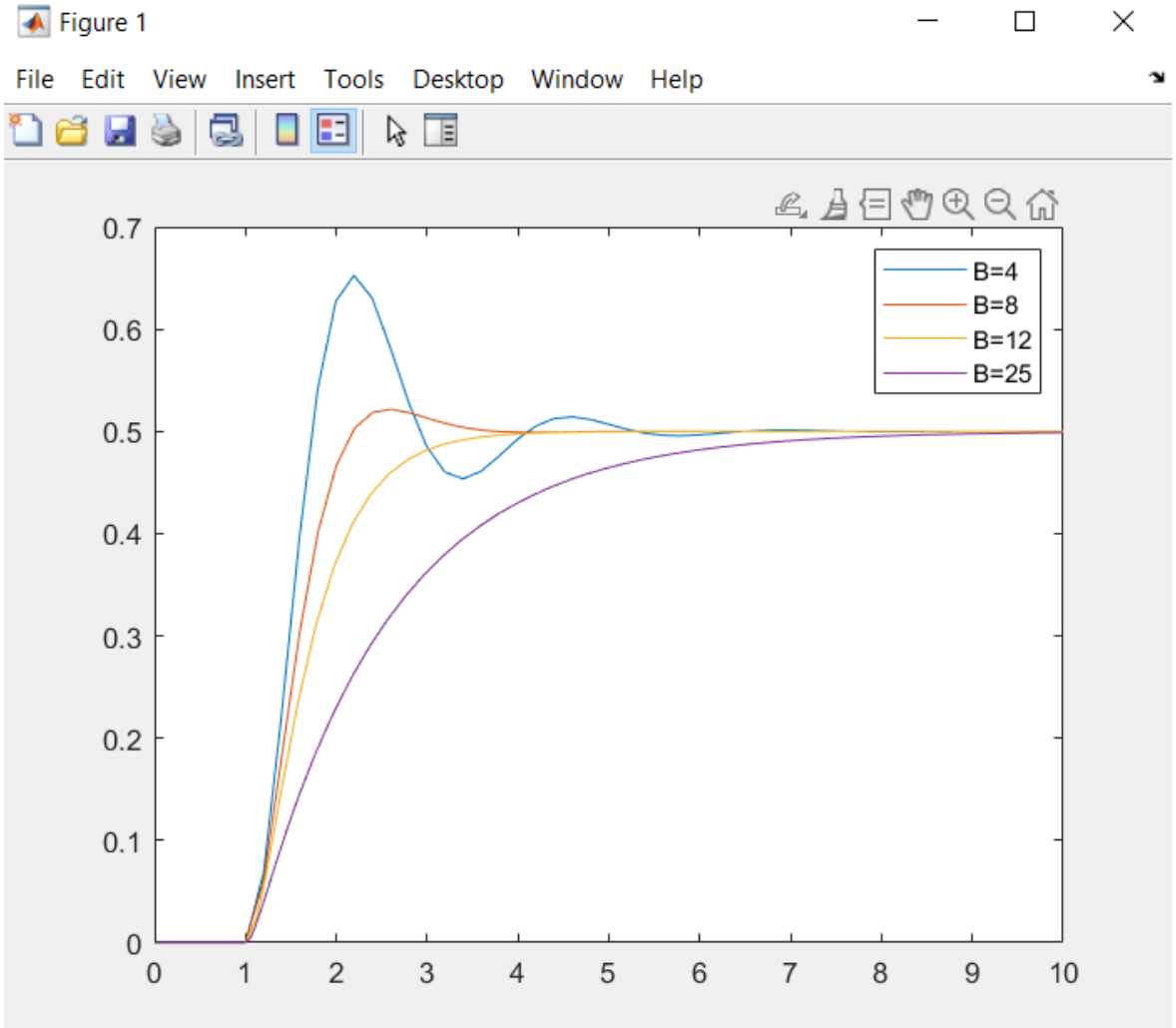
SIMULATE A SYSTEM USE SIMULINK with Matlab



SIMULATE A SYSTEM USE SIMULINK with Matlab

```
M=2;
K=16;
B=4;
fafinal = 8;
sim('lab1_simulink_model')
plot(t,x);
hold on
B=8; sim('lab1_simulink_model');plot(t,x)
B=12; sim('lab1_simulink_model');plot(t,x)
B=25; sim('lab1_simulink_model');plot(t,x)
legend('B=4','B=8','B=12','B=25');
hold off
```

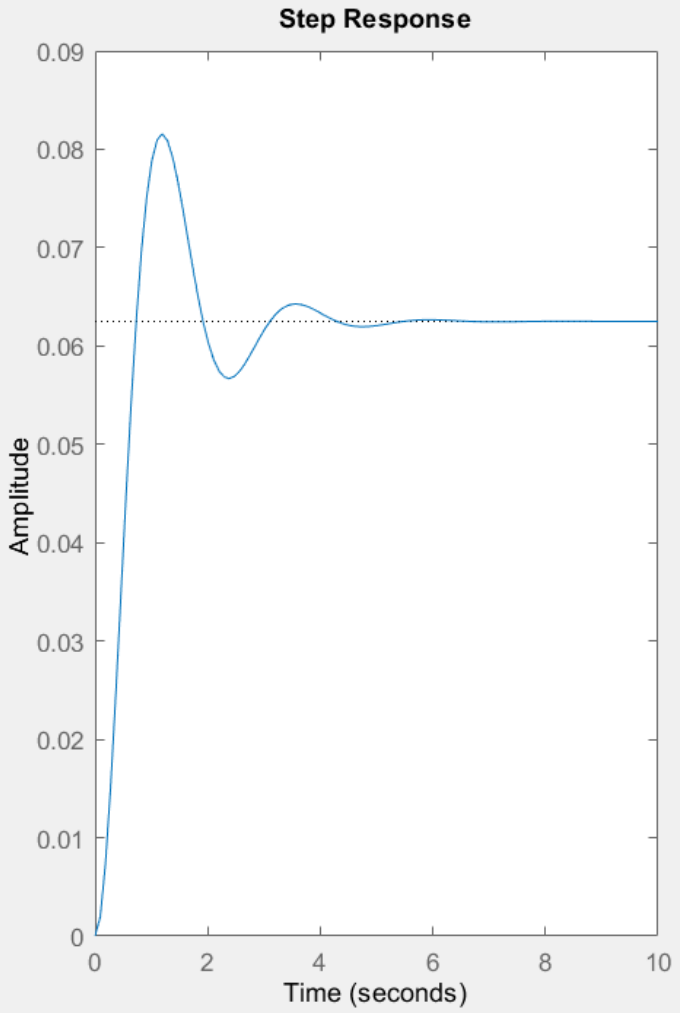
SIMULATE A SYSTEM USE SIMULINK with Matlab

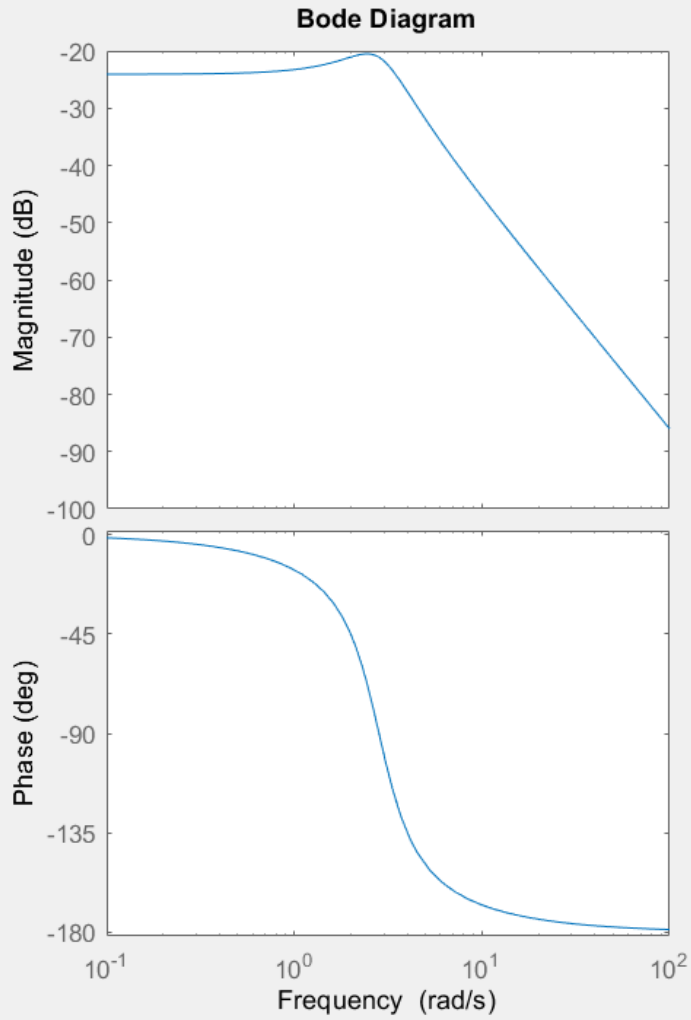


SIMULATE A SYSTEM USE MATLAB CODE

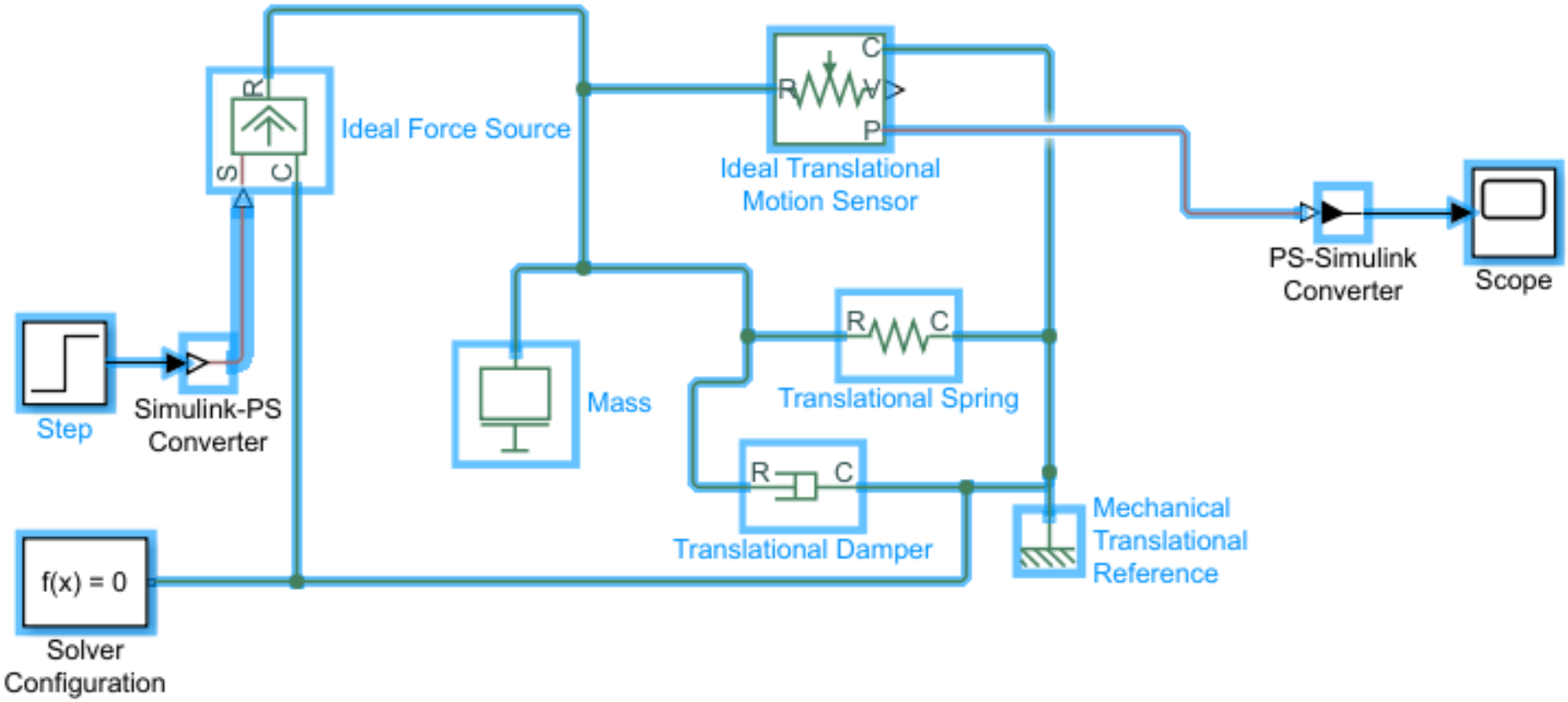
```
M=2;
K=16;
B=4
numeratorM=1;
denominatorM=[M 0];
sysM=tf(numeratorM,denominatorM)
numeratorI=1;
denominatorI=[1 0];
sysI=tf(numeratorI,denominatorI)
sysMD=feedback(sysM,B)
sysMDS=feedback(series(sysMD,sysI),K)
subplot(1,2,1)
step(sysMDS,10)
subplot(1,2,2)
bode(sysMDS)
```

SIMULATE A SYSTEM USE MATLAB CODE





SIMULATE A SYSTEM USE SIMSCAPE



SIMULATE A SYSTEM USE SIMSCAPE