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## MECH 370 Lab 1

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# Requirements

- **Attendance is mandatory**

Do not be late

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

Deadline is date of next Lab.

# Contact

- Submit questions to Github:

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

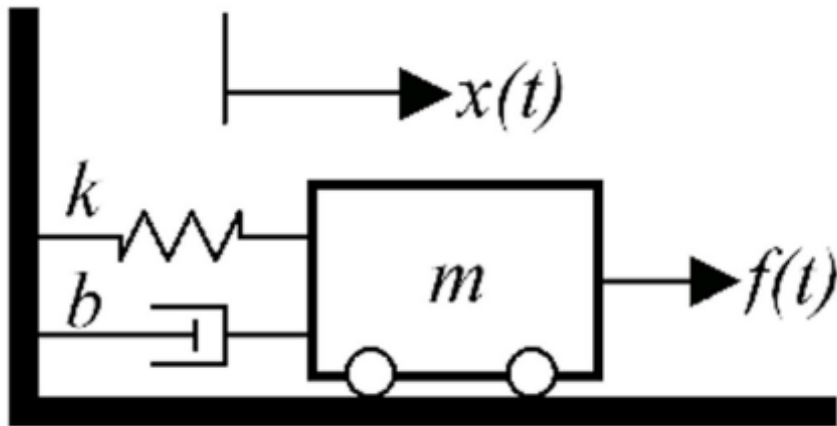
- Emails are only for personal purpose.

# Purpose

Learning the basic usage of:

- Matlab programming language
- Simulink
- Simscape

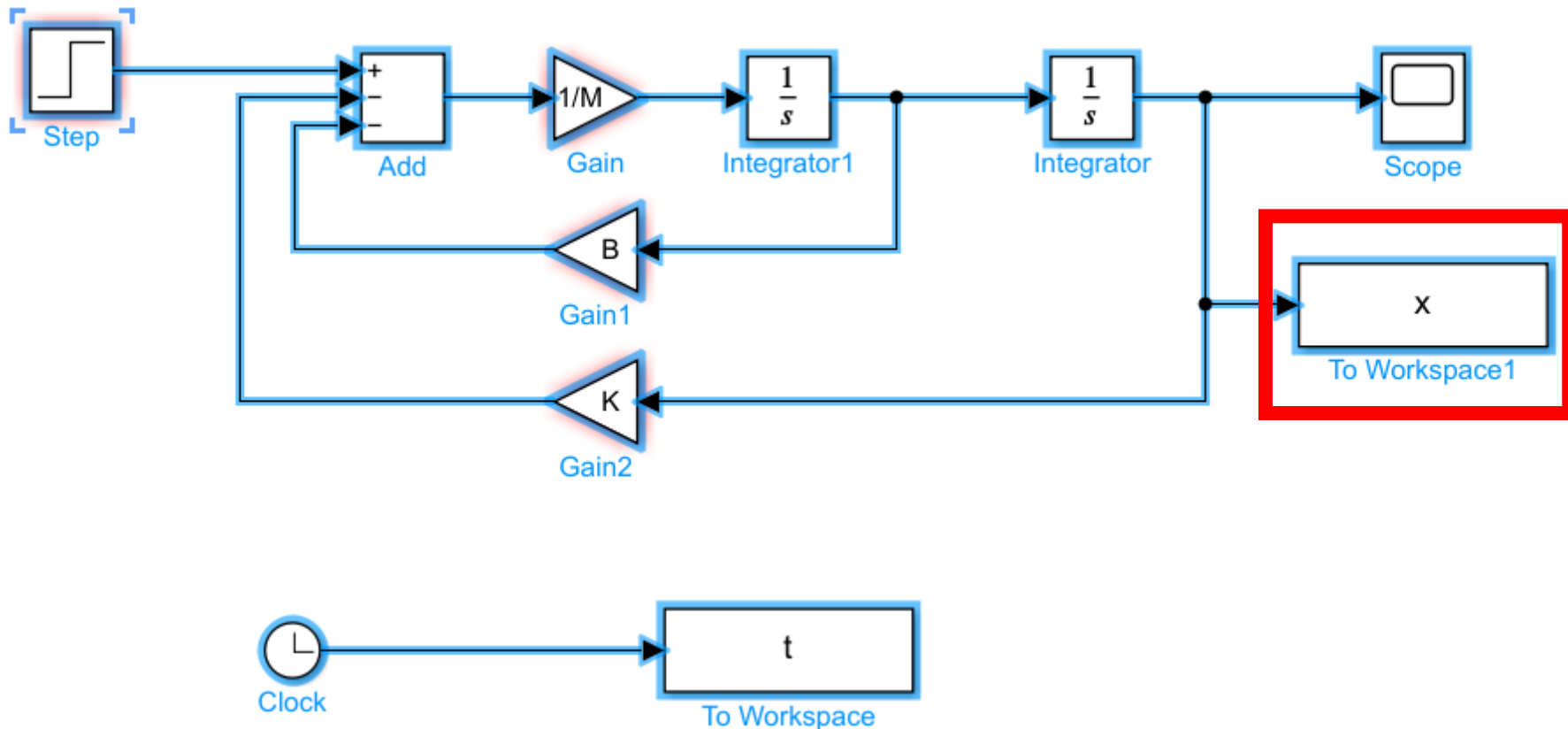
# SIMULATE A SYSTEM USE SIMULINK



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

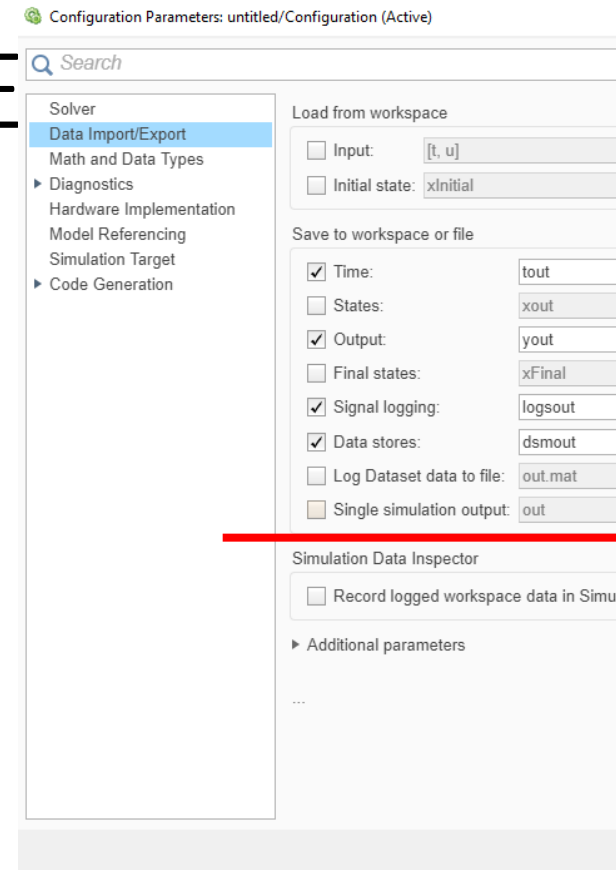
$$\ddot{x} = \frac{1}{M} [f(t) - B\dot{x} - Kx]$$

# SIMULATE A SYSTEM USE SIMULINK with Matlab

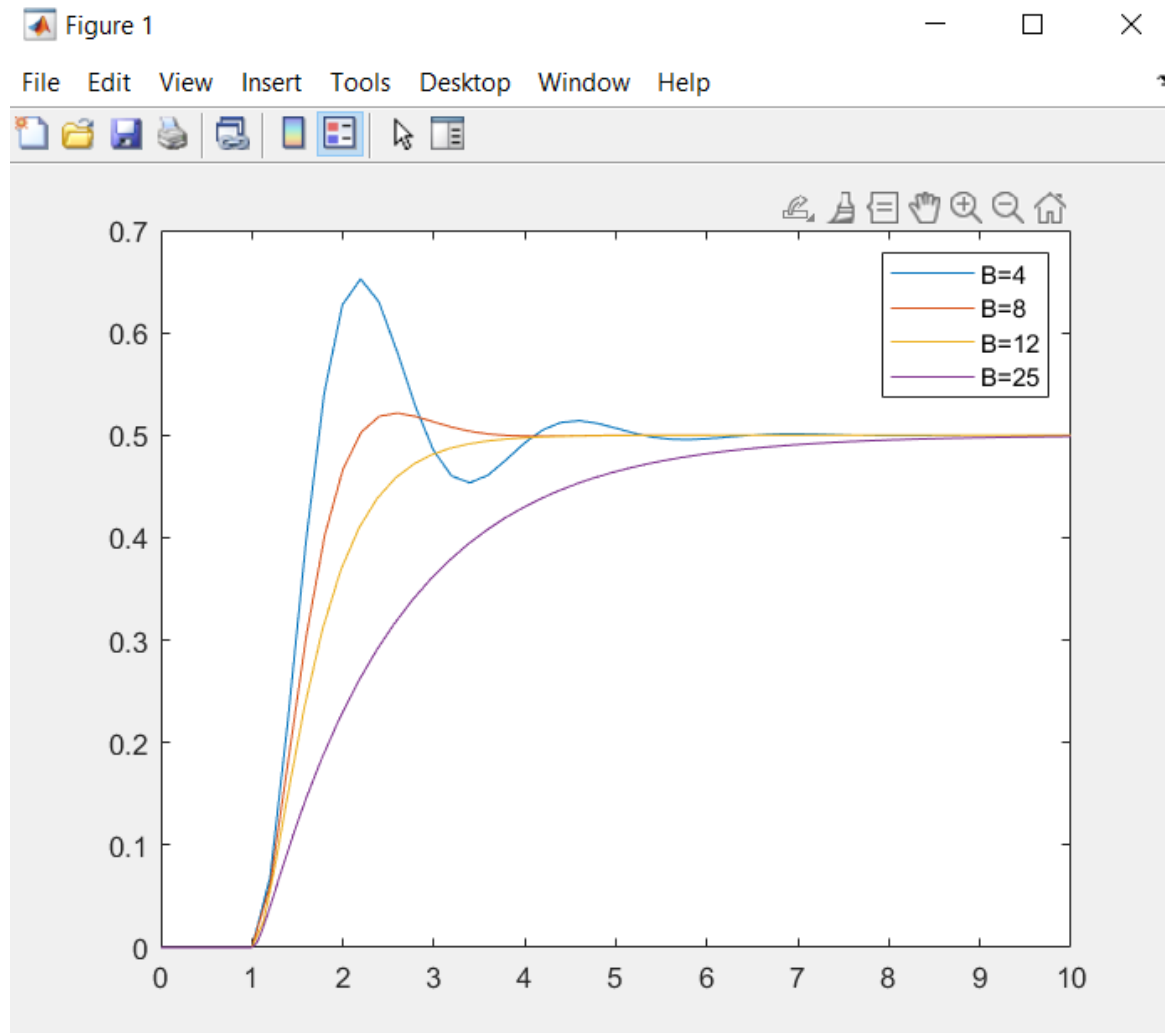


# SIMULATE A SYSTEM USE SIMULINK with Matlab

```
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

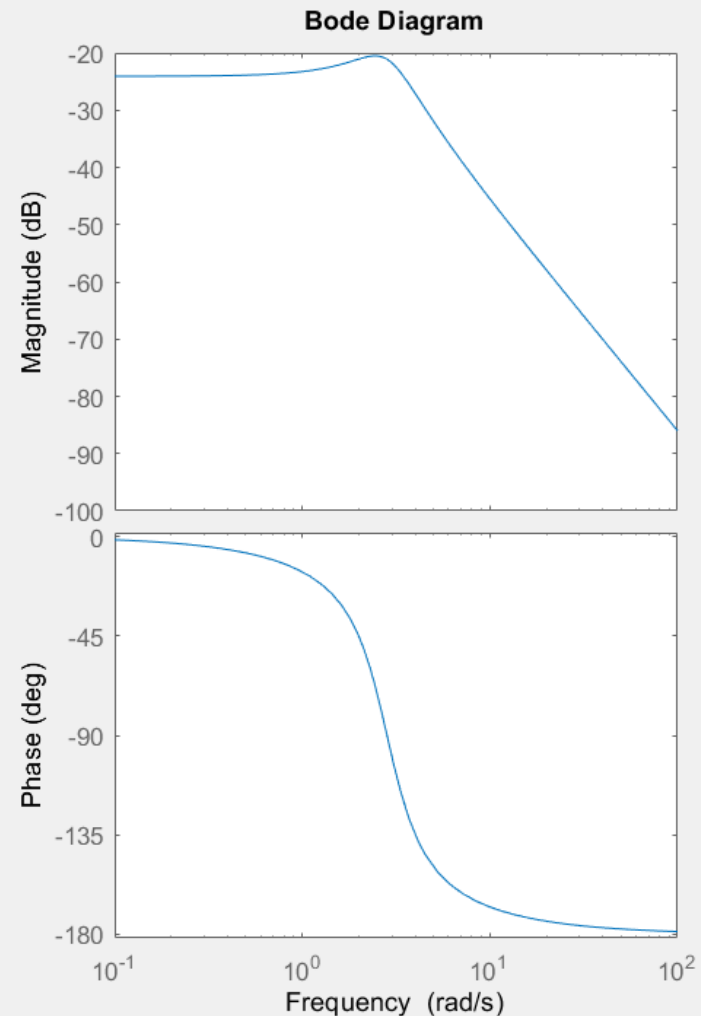
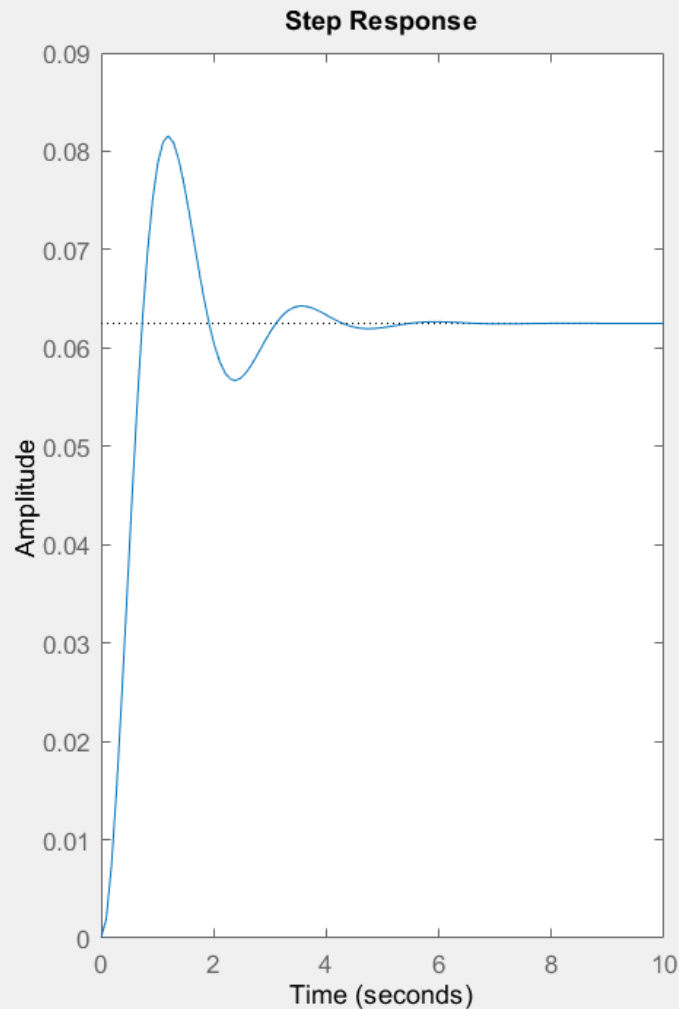




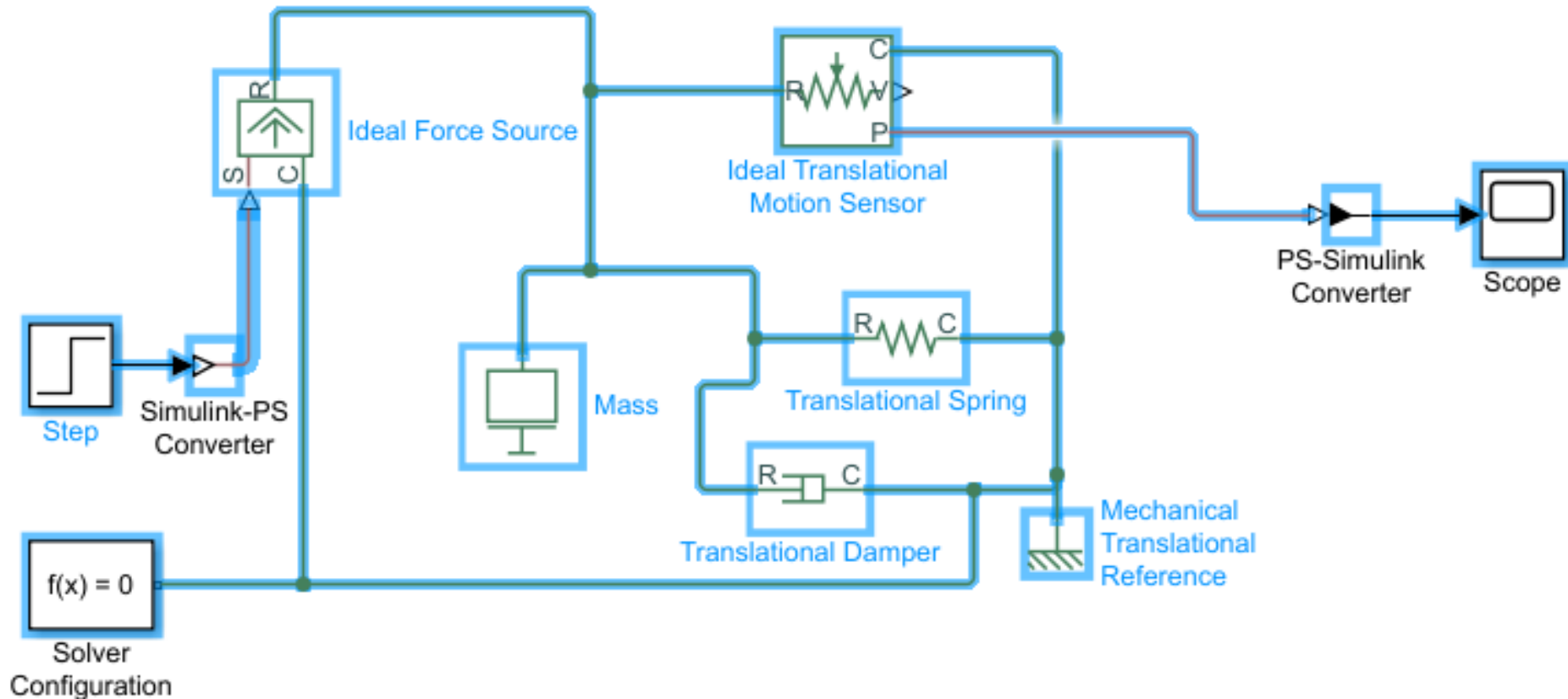
# SIMULATE A SYSTEM USE MATLAB CODE

```
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

