

MECH 370 Lab 1

Lab demonstrator: Qiaomeng Qin

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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

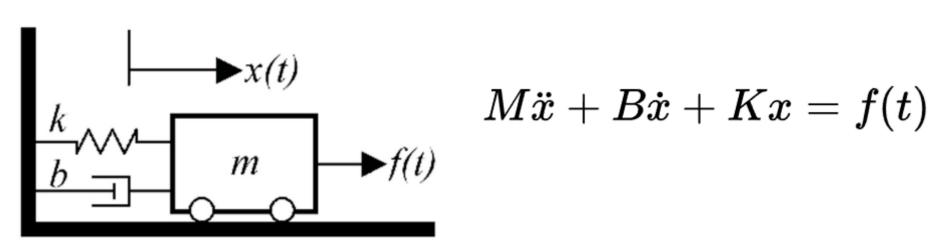
• Emails are only for personal purpose.

Purpose

Learning the basic usage of:

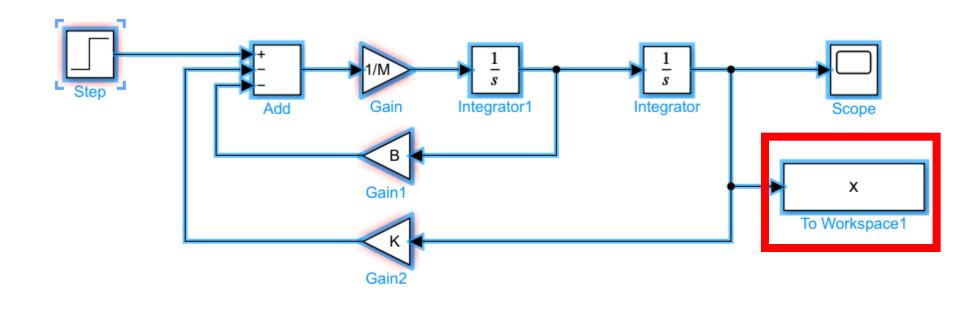
- Matlab programming language
- Simulink
- Simscape

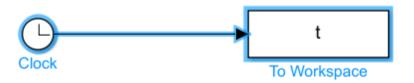
SIMULATE A SYSTEM USE SIMULINK



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

SIMULATE A SYSTEM USE SIMULINK with Matlab





SIMULATE A SYSTEM USE SIMULINK with Matlab

M=2;

K=16;

Configuration Parameters: untitled/Configuration (Active)

Load from workspace

Initial state: xInitial

Save to workspace or file

✓ Time:

States:

✓ Output:

Final states:

✓ Data stores:

✓ Signal logging:

[t, u]

tout

xout

yout

xFinal

logsout

dsmout

Q Search

Solver

Data Import/Export

Simulation Target

Code Generation

Math and Data Types
Diagnostics

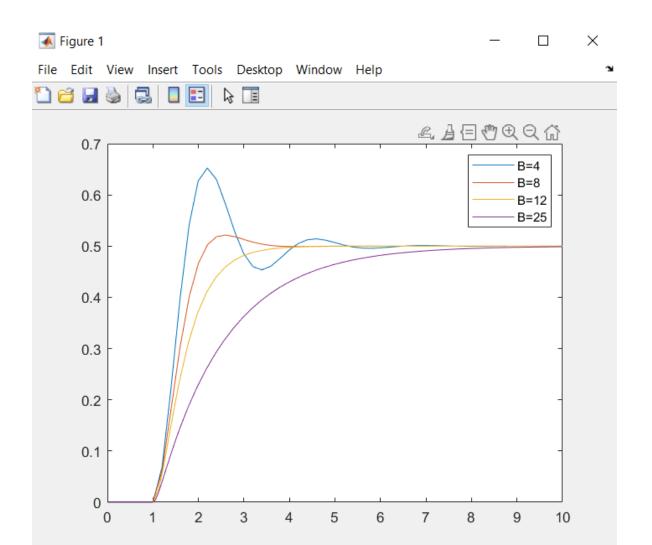
Hardware Implementation Model Referencing

```
Log Dataset data to file: out.mat
B=4;
                                                             Single simulation output: out
                                                             Simulation Data Inspector
fafinal = 8;
                                                             Record logged workspace data in Simu

    Additional parameters

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
```

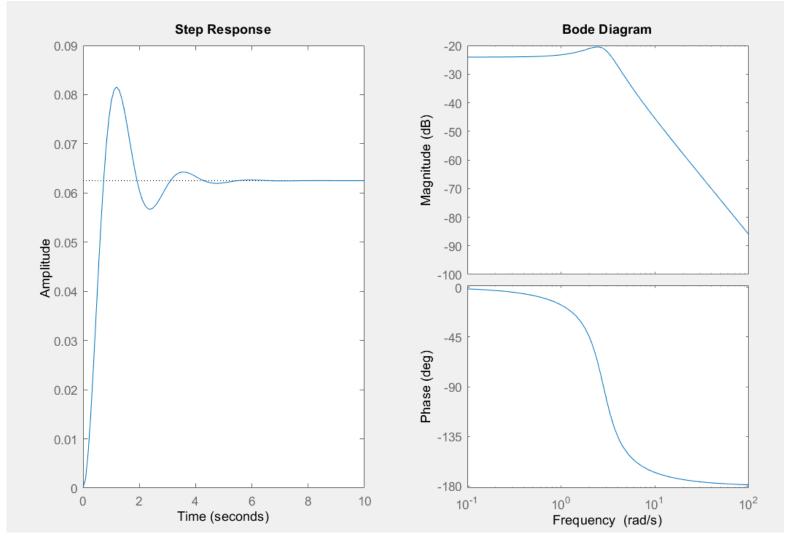
SIMULATE A SYSTEM USE SIMULINK with Matlab



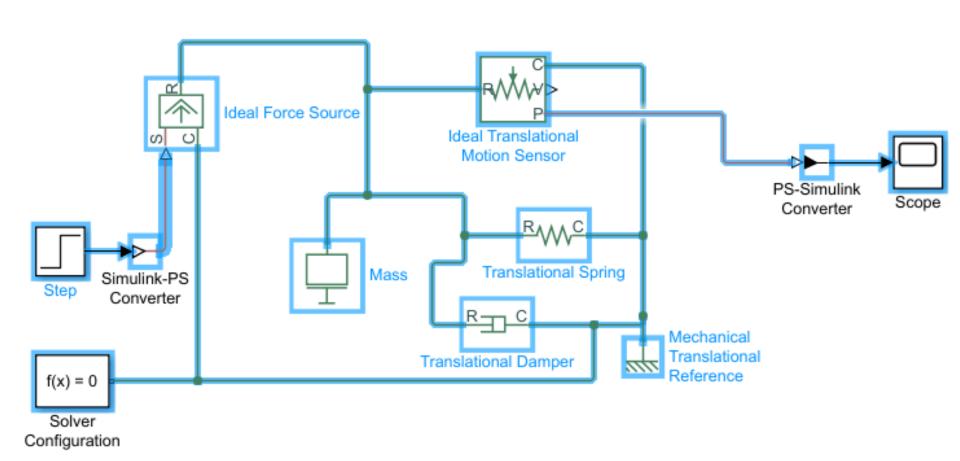
SIMULATE A SYSTEM USE MATLAB CODE

```
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

