Contents

Laboratório de Sistemas dinâmicos

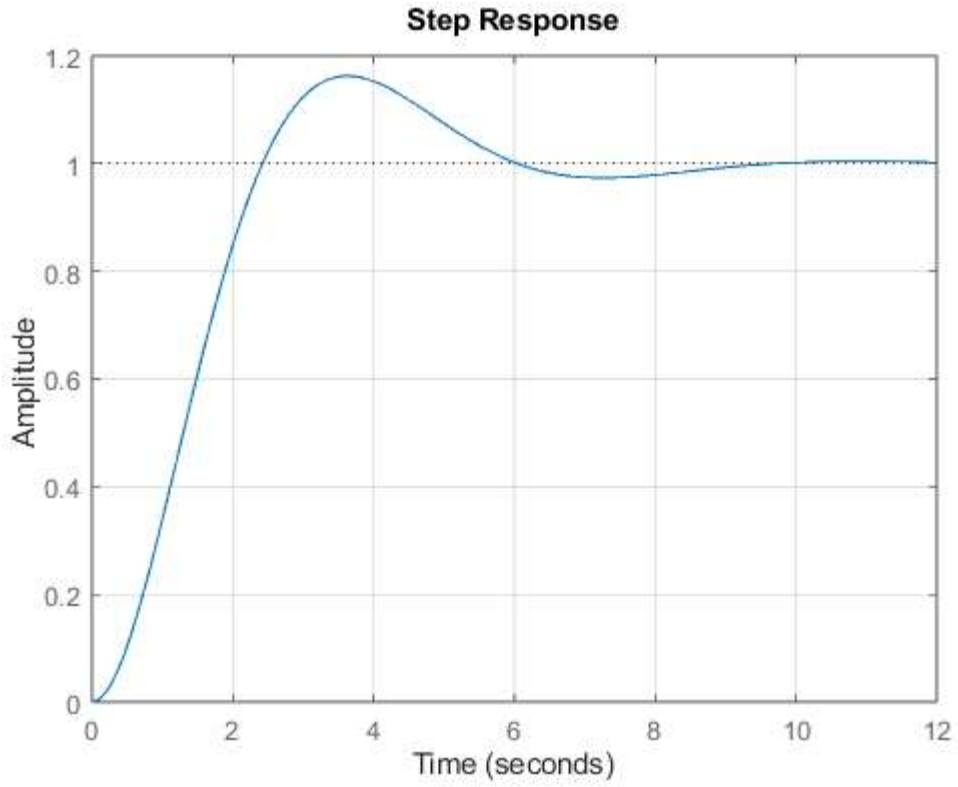
Prática 07 Data: 15/07/2024 Autores: Ana Clara Gomes & João Vitor Barbosa

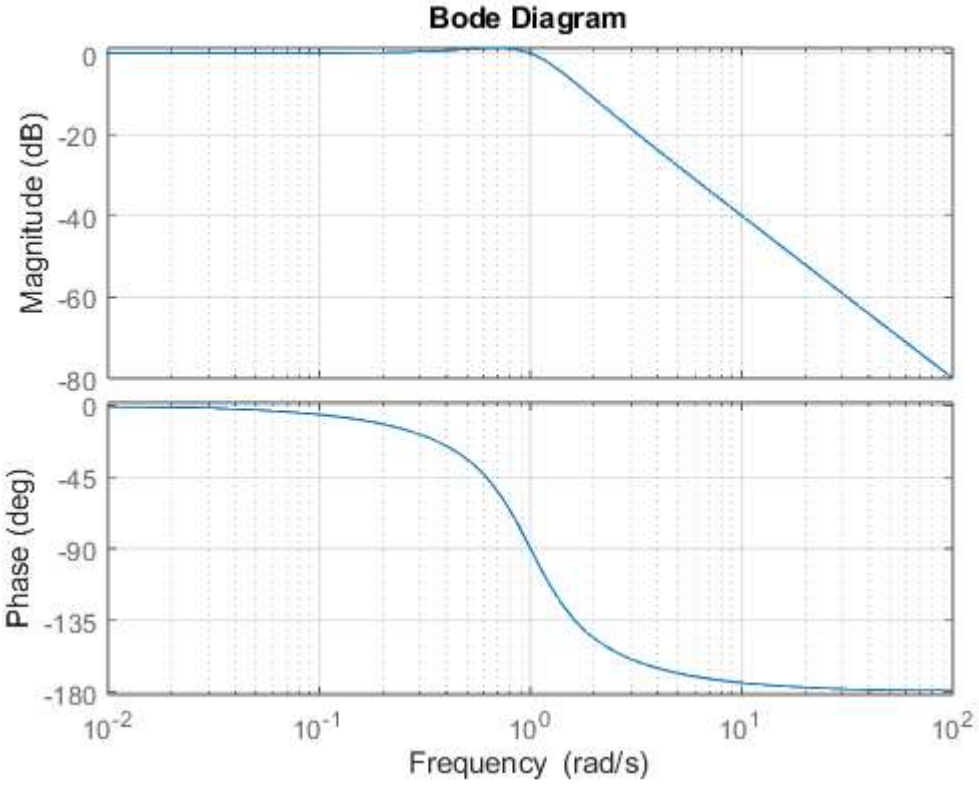
```
%%Limpar Workspace
clear all;
close all;
clc;
```

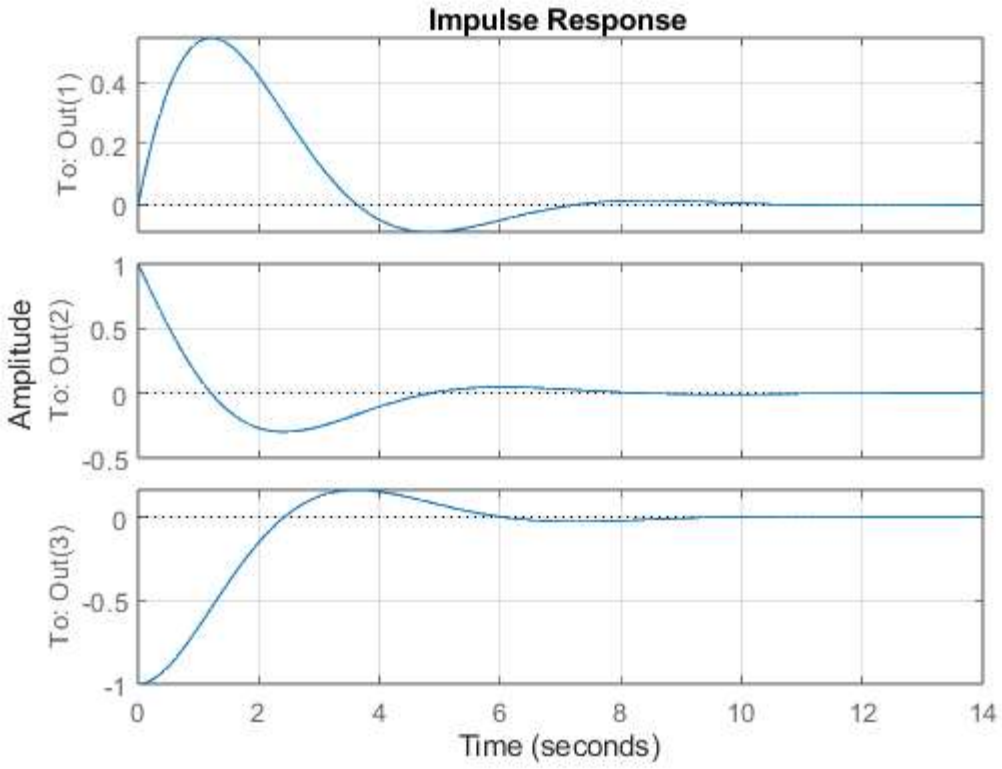
Script Prática 7

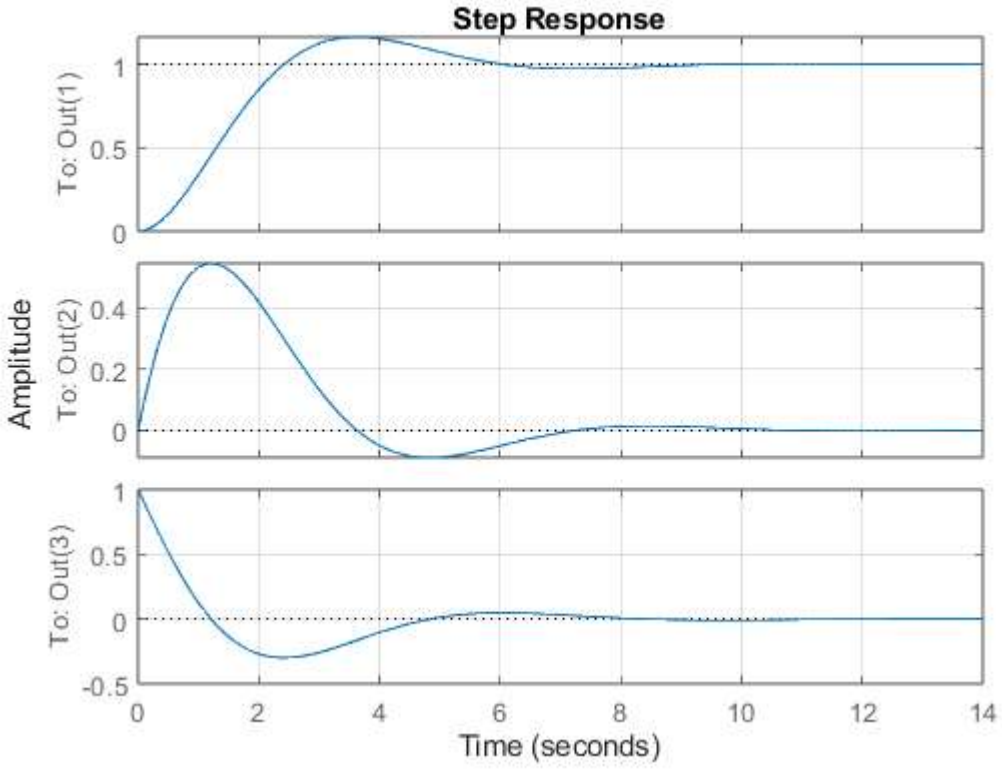
Exercicio 1 b, c, d, e)

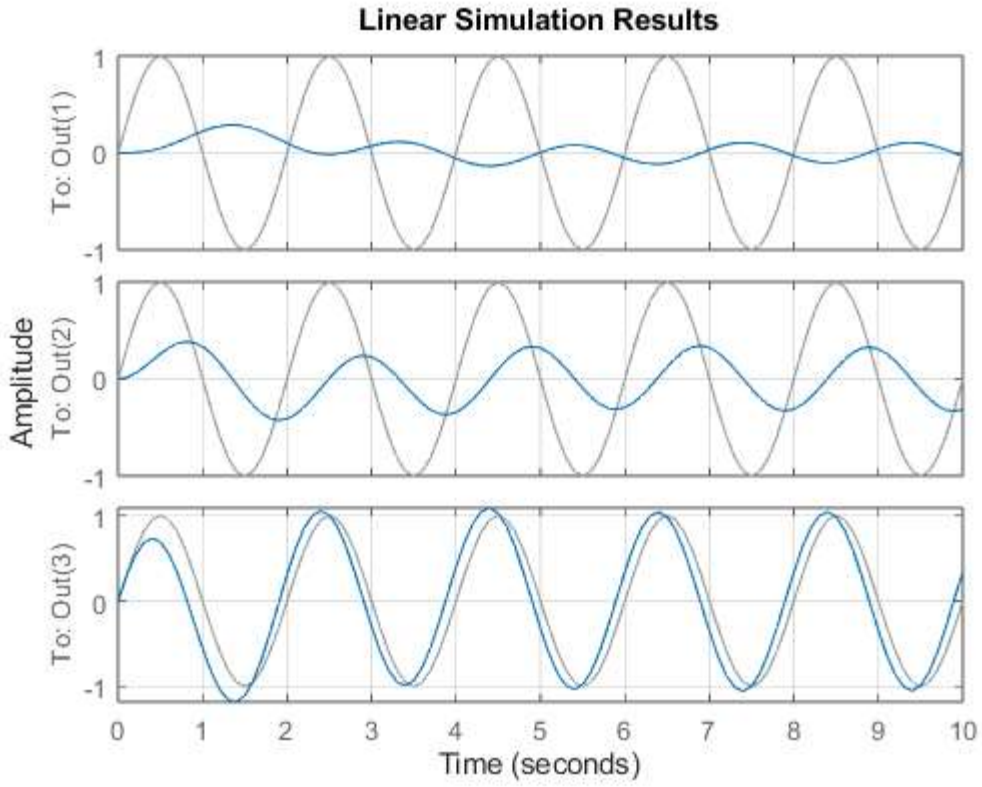
```
m=1;
c = 1;
k = 1;
G1=tf(1,[m c k]);
figure(1);
step(G1);grid('on');
figure(2);
bode(G1);grid('on');

A = [0 1;-k/m -c/m];
B = [0;1/m];
C = [1 0;0 1;-k/m -c/m];
D = [0;0;1/m];
Gss = ss(A,B,C,D);

figure(3);
impulse(Gss);grid('on');
figure(4);
step(Gss);grid('on');

W= 2 * pi * 0.5;
t =0:0.1:10;
u = sin(W*t);

figure(5);
lsim(Gss,u,t);grid('on');
```


Step Response
Amplitude
Time (seconds)
0
0.2
0.4
0.6
0.8
1
1.2
0
2
4
6
8
10
12


Bode Diagram
Magnitude (dB)
Phase (deg)
Frequency (rad/s)
0
-20
-40
-60
-80
0
-45
-90
-135
-180
10^-2
10^-1
10^0
10^1
10^2

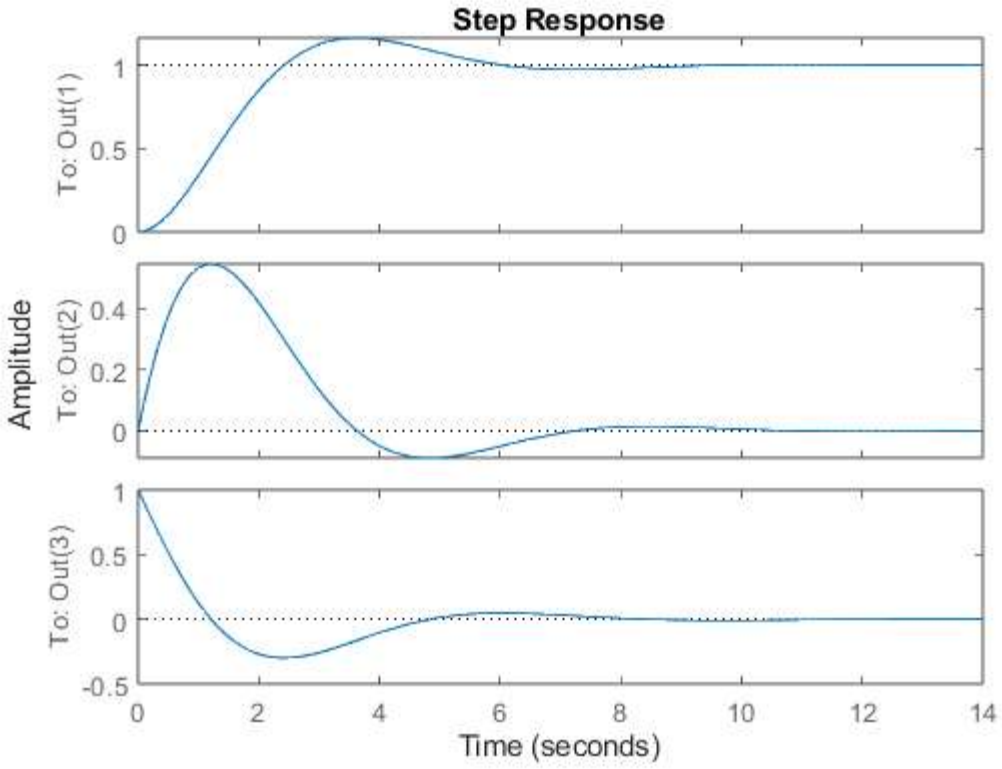

Impulse Response
Amplitude
To: Out(1)
To: Out(2)
To: Out(3)
Time (seconds)

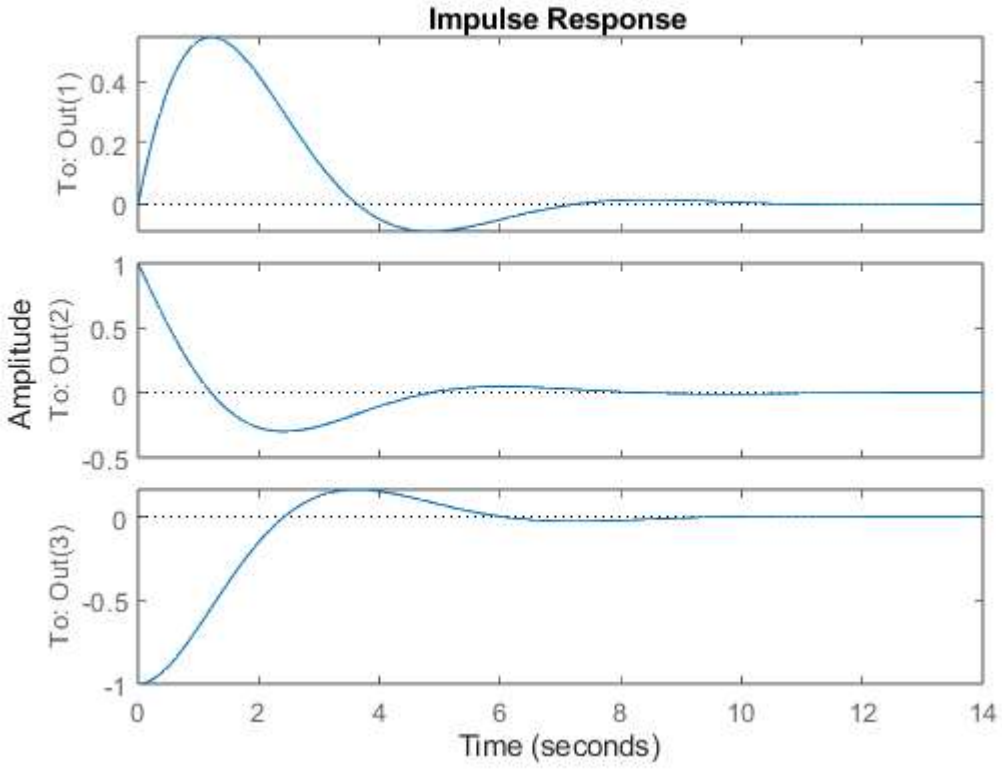

Step Response
Amplitude
To: Out(1)
To: Out(2)
To: Out(3)
Time (seconds)

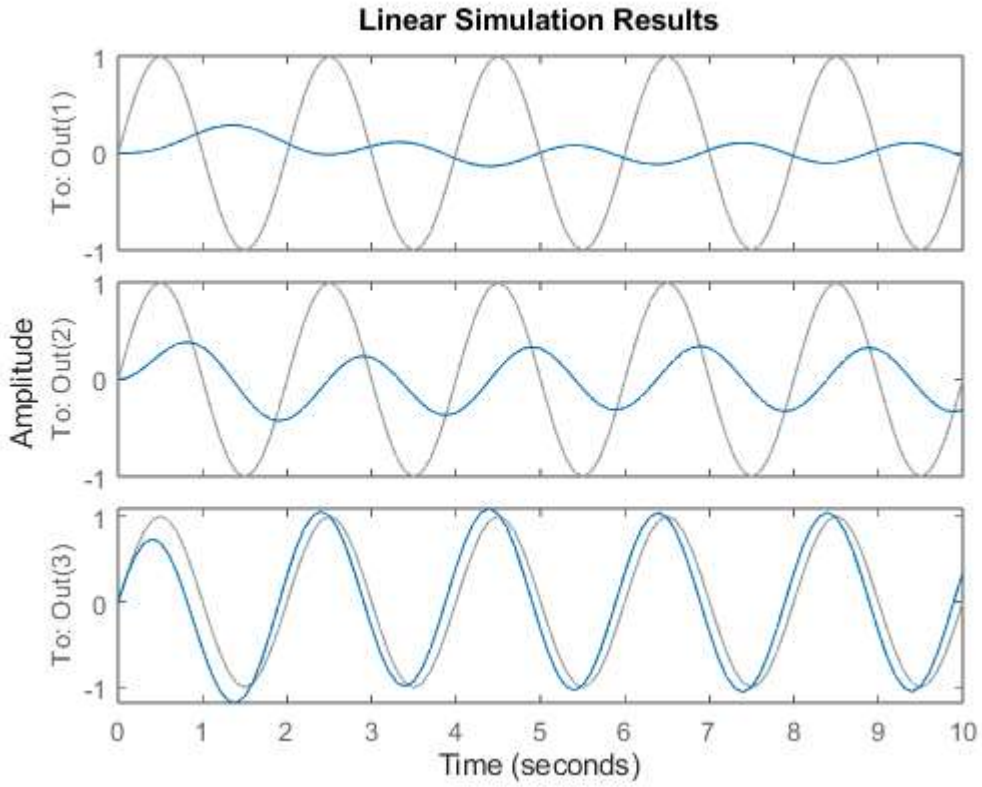


Exercicio 2 d)

```
m1=1;
m2=2;
k1=100;
k2=20;
k3=20;
b=12;

G1=tf([m2 b k2+k3],[m c k]);
G2 = tf(1,[m c k]);

A = [0 1;-k/m -c/m];
B = [0;1/m];
C = [1 0;0 1;-k/m -c/m];
D = [0;0;1/m];
Gss = ss(A,B,C,D);
figure(1);
step(Gss);
figure(2);
impulse(Gss);


W= 2 * pi * 0.5;
t =0:0.1:10;
u = sin(W*t);
figure(3);
lsim(Gss,u,t);
figure(4);
grid('on');
```


Step Response
Amplitude
To: Out(1)
To: Out(2)
To: Out(3)
Time (seconds)


Impulse Response
Amplitude
To: Out(1)
To: Out(2)
To: Out(3)
Time (seconds)



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