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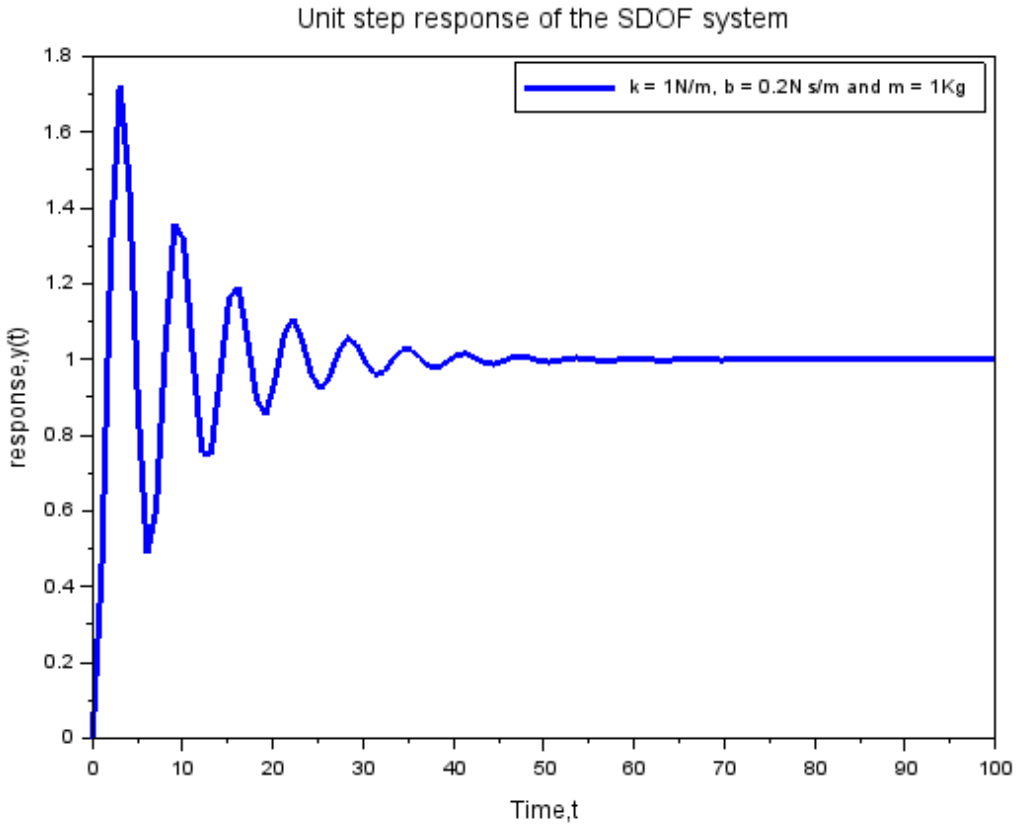
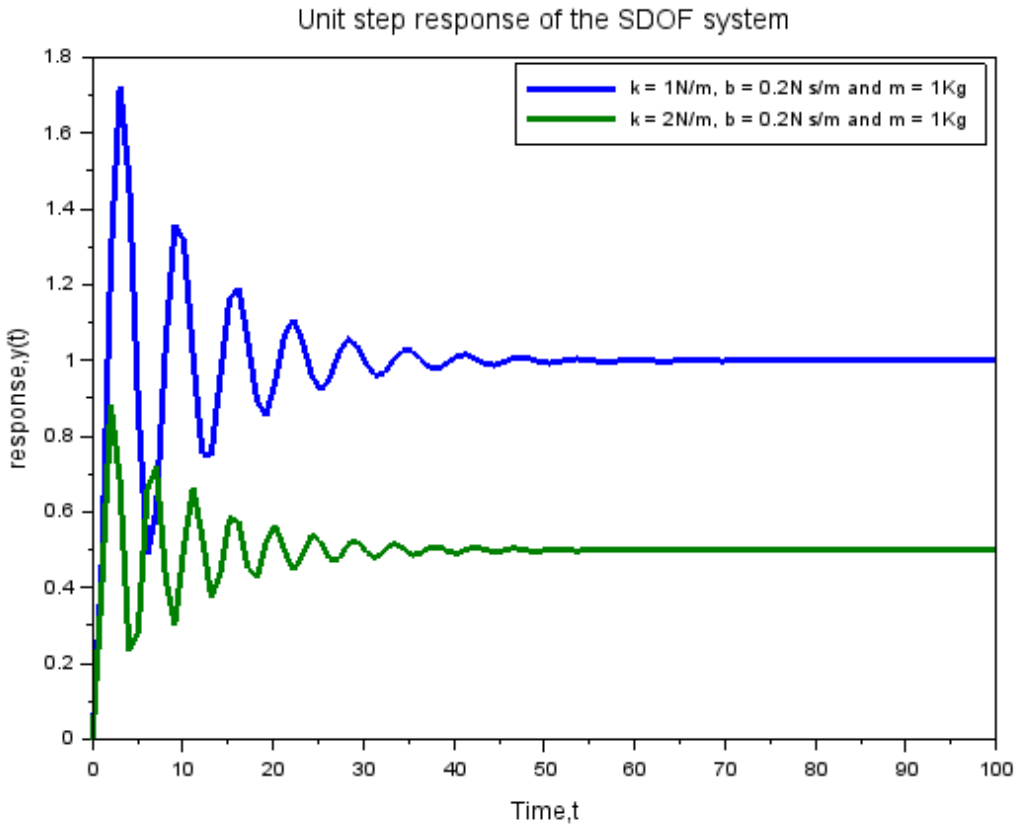
Task 1




```
clc()
clear
clf;

k1 = 1;
b1 = 0.2;
m1 = 1;

A1 = [0 1; -k1/m1 -b1/m1];
B1 = [0; 1/m1];
C1= [1 0];
D1 = [0];

s1 = syslin('c', A1,B1,C1);
t = linspace (0,100,100)
y1 = csim('step',t,s1)
plot(t, y1, 'Linewidth' , 3)

title('Unit step response of the SDOF system', 'frontsize', 5)
xlabel('Time,t','frontsize',3)
ylabel('response,y(t)','frontsize',3)
legend(['k = 1N/m, b = 0.2N s/m and m = 1Kg']);
```

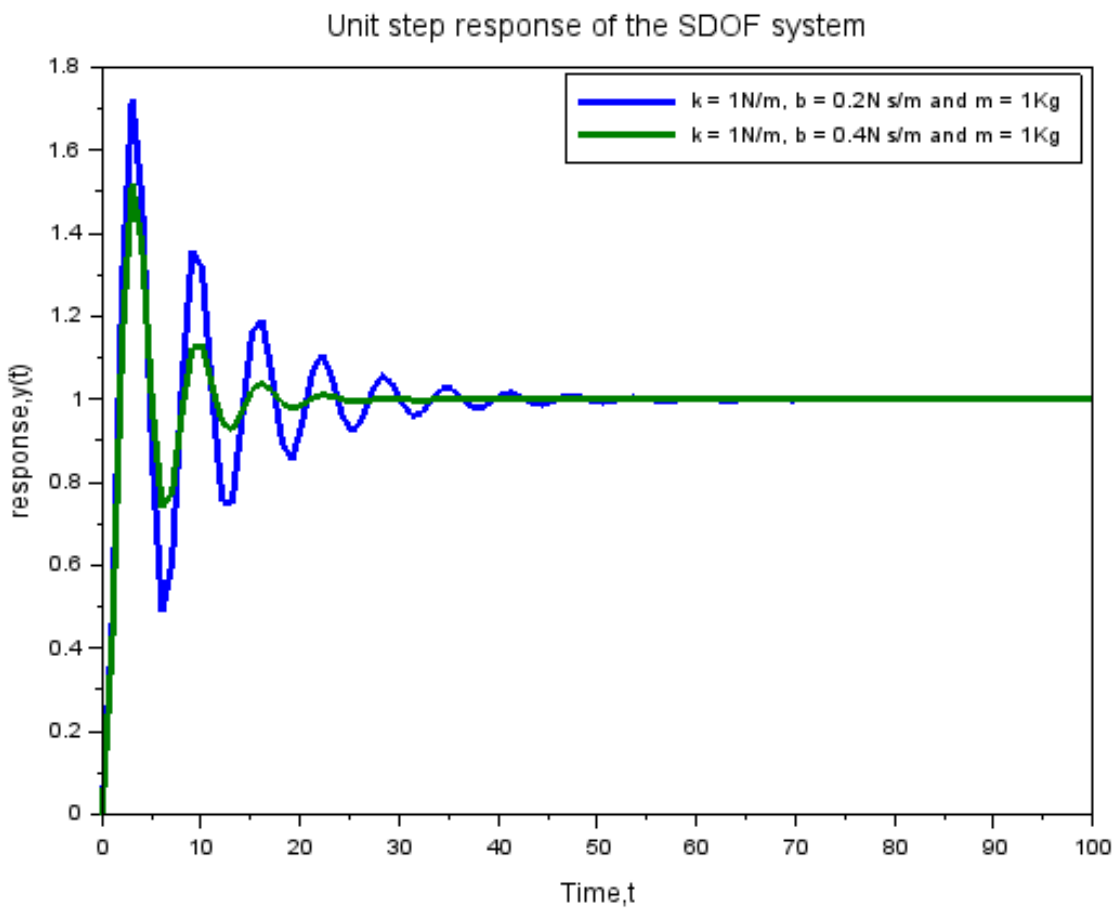
Task 2




```
clc()
clear
clf;

k1 = 1;
b1 = 0.2;
m1 = 1;

A1 = [0 1; -k1/m1 -b1/m1];
B1 = [0; 1/m1];
C1= [1 0];
D1 = [0];

s1 = syslin('c', A1,B1,C1);
t = linspace (0,100,100)
y1 = csim('step',t,s1)

//system 2//
k2 = 2;
b2 = 0.2;
m2 = 1;

A2 = [0 1; -k2/m2 -b2/m2];
B2 = [0; 1/m2];
C2= [1 0];
D2 = [0];

s2 = syslin('c', A2,B2,C2);
```

```
y2 = csim('step',t,s2)

plot(t,y1, t, y2, 'Linewidth' , 3)

title('Unit step response of the SDOF system', 'frontsize', 5)
xlabel('Time,t','frontsize',3)
ylabel('response,y(t)','frontsize',3)
legend(['k = 1N/m, b = 0.2N s/m and m = 1Kg'; 'k = 2N/m, b = 0.2N s/m and m = 1Kg']);
```

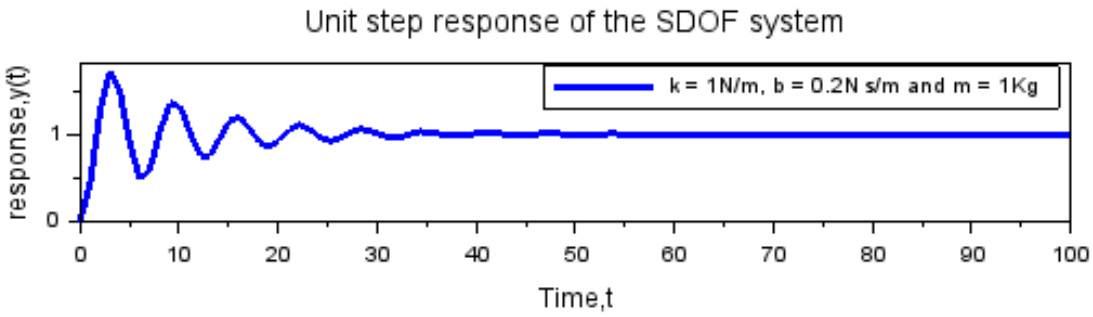
Task 3

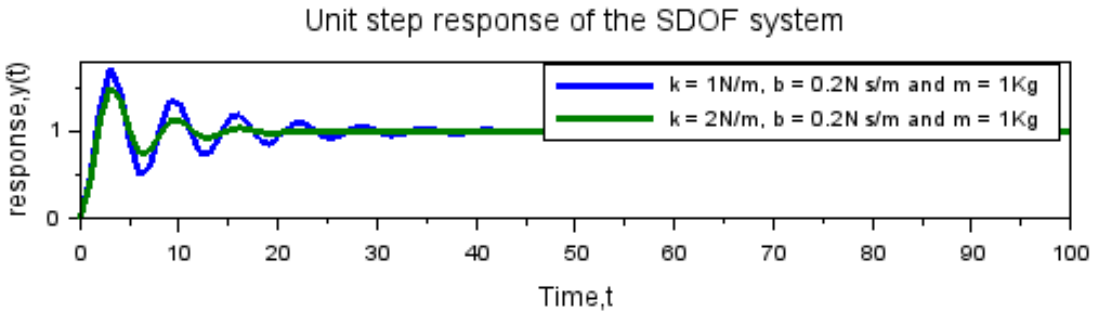


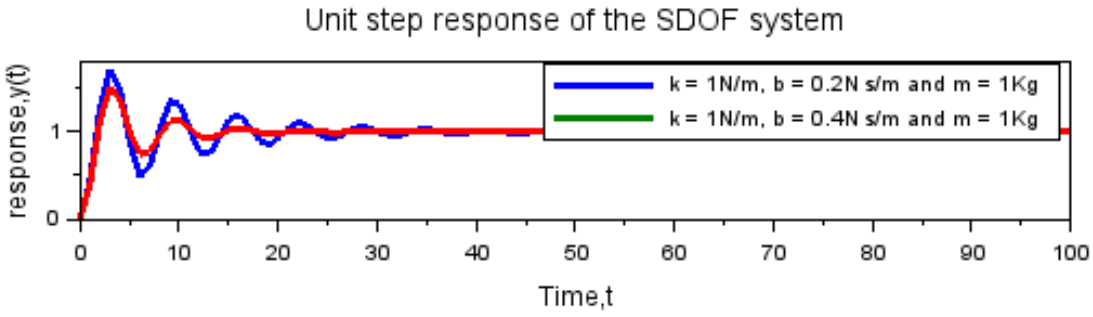

```
clc()
clear
clf;

k1 = 1;
b1 = 0.2;
m1 = 1;

A1 = [0 1; -k1/m1 -b1/m1];
B1 = [0; 1/m1];
C1= [1 0];
D1 = [0];

s1 = syslin('c', A1,B1,C1);
t = linspace (0,100,100)
y1 = csim('step',t,s1)
```

```
//system 2//
k2 = 1;
b2 = 0.4;
m2 = 1;

A2 = [0 1; -k2/m2 -b2/m2];
B2 = [0; 1/m2];
C2= [1 0];
D2 = [0];

s2 = syslin('c', A2,B2,C2);
y2 = csim('step',t,s2)

plot(t,y1, t, y2, 'Linewidth' , 3)

title('Unit step response of the SDOF system', 'frontsize', 5)
xlabel('Time,t','frontsize',3)
ylabel('response,y(t)','frontsize',3)
legend(['k = 1N/m, b = 0.2N s/m and m = 1Kg'; 'k = 1N/m, b = 0.4N s/m and m = 1Kg']);
```

Task 4








```
clc()
clear
clf;
// system 1//
k1 = 1;
b1 = 0.2;
m1 = 1;

A1 = [0 1; -k1/m1 -b1/m1];
B1 = [0; 1/m1];
C1= [1 0];
D1 = [0];

s1 = syslin('c', A1,B1,C1);
t = linspace (0,100,100)
y1 = csim('step',t,s1)

//system 2//
k2 = 1;
b2 = 0.4;
m2 = 1;

A2 = [0 1; -k2/m2 -b2/m2];
B2 = [0; 1/m2];
C2= [1 0];
D2 = [0];
```

```
s2 = syslin('c', A2,B2,C2);
y2 = csim('step',t,s2)

//system 3//

k3 = 1;
b3 = 0.4;
m3 = 1;

A3 = [0 1; -k3/m3 -b3/m3];
B3 = [0; 1/m3];
C3= [1 0];
D3 = [0];

s3 = syslin('c', A3,B3,C3);
y3 = csim('step',t,s3)

//plotting//
subplot(3,1,1)
plot (t,y1,'linewidth',3)
title('Unit step response of the SDOF system', 'frontsize', 5)
xlabel('Time,t','frontsize',3)
ylabel('response,y(t)','frontsize',3)
legend(['k = 1N/m, b = 0.2N s/m and m = 1Kg'; ]);

subplot(3,1,2)
plot (t,y1, t, y2,'linewidth',3)
title('Unit step response of the SDOF system', 'frontsize', 5)
xlabel('Time,t','frontsize',3)
ylabel('response,y(t)','frontsize',3)
legend(['k = 1N/m, b = 0.2N s/m and m = 1Kg'; 'k = 2N/m, b = 0.2N s/m and m = 1Kg']);

subplot(3,1,3)
plot (t,y1, t,y2, t,y3,'linewidth',3)

title('Unit step response of the SDOF system', 'frontsize', 5)
xlabel('Time,t','frontsize',3)
ylabel('response,y(t)','frontsize',3)
legend(['k = 1N/m, b = 0.2N s/m and m = 1Kg'; 'k = 1N/m, b = 0.4N s/m and m = 1Kg']);
```

Task 5

```
clc()
clear

matrixA = [2 1 -2; 3 -3 -1; 1 -2 3]
B = [-1;5;6]
X = inv(matrixA)*B
```