Atividade 05 - Sistemas de controle com resposta deadbeat

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https://github.com/JuliaOli/Controle-II

```
close all
clc

Ts = 1;
num = [1 0.5];
den = [1 -2.05 1.325 -0.252];

G_p = tf(num,den,1)
```

```
G_p =

             z + 0.5
  -------------------------------
   z^3 - 2.05 z^2 + 1.325 z - 0.252

Sample time: 1 seconds
Discrete-time transfer function.
```

```
G_p = G_p*0.05
```

```
G_p =

          0.05 z + 0.025
  -------------------------------
   z^3 - 2.05 z^2 + 1.325 z - 0.252

Sample time: 1 seconds
Discrete-time transfer function.
```

```
%%
ordem_den = length(den)
```

```
ordem_den = 4
```

```
ordem_num = length(num)
```

```
ordem_num = 2
```

```
n = ordem_den - ordem_num
```

```
n = 2
```

```
%%
M = tf('z', Ts);
M = M^(-n)
```

```
M =

    1
   ---
   z^2
```

```
Sample time: 1 seconds
Discrete-time transfer function.
```

```
%%
G_aux = G_p^(-1)
```

```
G_aux =

  z^3 - 2.05 z^2 + 1.325 z - 0.252
  --------------------------------
            0.05 z + 0.025

Sample time: 1 seconds
Discrete-time transfer function.
```

```
M_aux = M/(1-M)
```

```
M_aux =

      z^2
  ---------
  z^4 - z^2

Sample time: 1 seconds
Discrete-time transfer function.
```

```
%%
D_c = M_aux*G_aux
```

```
D_c =

    z^5 - 2.05 z^4 + 1.325 z^3 - 0.252 z^2
  ------------------------------------------
  0.05 z^5 + 0.025 z^4 - 0.05 z^3 - 0.025 z^2

Sample time: 1 seconds
Discrete-time transfer function.
```

```
C = (D_c*G_p)/(1+D_c*G_p)
```

```
C =

  0.0025 z^14 - 0.00775 z^13 + 0.005006 z^12 + 0.007477 z^11 - 0.01109 z^10 + 0.001865 z^9 + 0.003819 z^

  ----------------------------------------------------------------------------------------------------

  0.0025 z^16 - 0.00775 z^15 + 0.005006 z^14 + 0.007477 z^13 - 0.01109 z^12 + 0.001865 z^11 + 0.003819 z

Sample time: 1 seconds
Discrete-time transfer function.
```

```
step(C, 100, 'r')
hold on
```

```
step(G_p, 100, 'k')
```


Step Response