

EJERCICIOS ENTREGABLES PRÁCTICA 2-3

Ejercicio 1 (2 puntos). Funciones de transferencia en MATLAB.

Se tiene la función de transferencia $G(s) = \frac{\alpha}{s^2 + s + \beta}$. Se pide encontrar, utilizando comandos de control de flujo (for, while, etc.) y tf/zpk, los valores de α y β que conduzcan a un sistema sobreamortiguado (con dos polos con parte real pura y diferente) aproximable a uno de primer orden con ganancia estática unitaria. Razone la respuesta.

```
alpha = 1; % Ganancia unitaria
for beta=-1:0.001:1
    if beta ~= 0
        G=tf([alpha], [1 1 beta]);
        chi = 1/(2*sqrt(beta)); % Calculamos chi
        if chi > 1 % Es sobreamortiguada
            chi
            s1 = -chi*sqrt(beta) + sqrt(beta)*sqrt(chi*chi - 1)
            s2 = -chi*sqrt(beta) - sqrt(beta)*sqrt(chi*chi - 1)
            G
            % Descartamos s2
            P = zpk([], [polo1], alpha)
        end
    end
end
end
```

```
chi = 15.8114
s1 = -0.0010
s2 = -0.9990
G =
```

```
      1
-----
s^2 + s + 0.001
```

Continuous-time transfer function.
Model Properties
P =

```
      1
-----
(s+0.001001)
```

Continuous-time zero/pole/gain model.
Model Properties
chi = 11.1803
s1 = -0.0020
s2 = -0.9980
G =

```
      1
-----
s^2 + s + 0.002
```

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 9.1287
s1 = -0.0030
s2 = -0.9970
G =

$$\frac{1}{s^2 + s + 0.003}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 7.9057
s1 = -0.0040
s2 = -0.9960
G =

$$\frac{1}{s^2 + s + 0.004}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 7.0711
s1 = -0.0050
s2 = -0.9950
G =

$$\frac{1}{s^2 + s + 0.005}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 6.4550

s1 = -0.0060

s2 = -0.9940

G =

$$\frac{1}{s^2 + s + 0.006}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 5.9761

s1 = -0.0070

s2 = -0.9930

G =

$$\frac{1}{s^2 + s + 0.007}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 5.5902

s1 = -0.0081

s2 = -0.9919

G =

$$\frac{1}{s^2 + s + 0.008}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 5.2705

s1 = -0.0091

s2 = -0.9909

G =

$$\frac{1}{s^2 + s + 0.009}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 5.0000

s1 = -0.0101

s2 = -0.9899

G =

$$\frac{1}{s^2 + s + 0.01}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 4.7673

s1 = -0.0111

s2 = -0.9889

G =

$$\frac{1}{s^2 + s + 0.011}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 4.5644

s1 = -0.0121

s2 = -0.9879

G =

$$\frac{1}{s^2 + s + 0.012}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 4.3853
s1 = -0.0132
s2 = -0.9868
G =

$$\frac{1}{s^2 + s + 0.013}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 4.2258
s1 = -0.0142
s2 = -0.9858
G =

$$\frac{1}{s^2 + s + 0.014}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 4.0825
s1 = -0.0152
s2 = -0.9848
G =

$$\frac{1}{s^2 + s + 0.015}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 3.9528

s1 = -0.0163

s2 = -0.9837

G =

$$\frac{1}{s^2 + s + 0.016}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 3.8348

s1 = -0.0173

s2 = -0.9827

G =

$$\frac{1}{s^2 + s + 0.017}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 3.7268

s1 = -0.0183

s2 = -0.9817

G =

$$\frac{1}{s^2 + s + 0.018}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 3.6274

s1 = -0.0194

s2 = -0.9806

G =

$$\frac{1}{s^2 + s + 0.019}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 3.5355

s1 = -0.0204

s2 = -0.9796

G =

$$\frac{1}{s^2 + s + 0.02}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 3.4503

s1 = -0.0215

s2 = -0.9785

G =

$$\frac{1}{s^2 + s + 0.021}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 3.3710

s1 = -0.0225

s2 = -0.9775

G =

$$\frac{1}{s^2 + s + 0.022}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 3.2969
s1 = -0.0236
s2 = -0.9764
G =

$$\frac{1}{s^2 + s + 0.023}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 3.2275
s1 = -0.0246
s2 = -0.9754
G =

$$\frac{1}{s^2 + s + 0.024}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 3.1623
s1 = -0.0257
s2 = -0.9743
G =

$$\frac{1}{s^2 + s + 0.025}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 3.1009

s1 = -0.0267

s2 = -0.9733

G =

$$\frac{1}{s^2 + s + 0.026}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 3.0429

s1 = -0.0278

s2 = -0.9722

G =

$$\frac{1}{s^2 + s + 0.027}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 2.9881

s1 = -0.0288

s2 = -0.9712

G =

$$\frac{1}{s^2 + s + 0.028}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 2.9361

s1 = -0.0299

s2 = -0.9701

G =

$$\frac{1}{s^2 + s + 0.029}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 2.8868

s1 = -0.0310

s2 = -0.9690

G =

$$\frac{1}{s^2 + s + 0.03}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 2.8398

s1 = -0.0320

s2 = -0.9680

G =

$$\frac{1}{s^2 + s + 0.031}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 2.7951

s1 = -0.0331

s2 = -0.9669

G =

$$\frac{1}{s^2 + s + 0.032}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 2.7524
s1 = -0.0342
s2 = -0.9658
G =

$$\frac{1}{s^2 + s + 0.033}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 2.7116
s1 = -0.0352
s2 = -0.9648
G =

$$\frac{1}{s^2 + s + 0.034}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 2.6726
s1 = -0.0363
s2 = -0.9637
G =

$$\frac{1}{s^2 + s + 0.035}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 2.6352
s1 = -0.0374
s2 = -0.9626
G =

$$\frac{1}{s^2 + s + 0.036}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 2.5994
s1 = -0.0385
s2 = -0.9615
G =

$$\frac{1}{s^2 + s + 0.037}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 2.5649
s1 = -0.0396
s2 = -0.9604
G =

$$\frac{1}{s^2 + s + 0.038}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 2.5318
s1 = -0.0407
s2 = -0.9593

G =

$$\frac{1}{s^2 + s + 0.039}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 2.5000

s1 = -0.0417

s2 = -0.9583

G =

$$\frac{1}{s^2 + s + 0.04}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 2.4693

s1 = -0.0428

s2 = -0.9572

G =

$$\frac{1}{s^2 + s + 0.041}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 2.4398

s1 = -0.0439

s2 = -0.9561

G =

$$\frac{1}{s^2 + s + 0.042}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 2.4112
s1 = -0.0450
s2 = -0.9550
G =

$$\frac{1}{s^2 + s + 0.043}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 2.3837
s1 = -0.0461
s2 = -0.9539
G =

$$\frac{1}{s^2 + s + 0.044}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 2.3570
s1 = -0.0472
s2 = -0.9528
G =

$$\frac{1}{s^2 + s + 0.045}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 2.3313

s1 = -0.0483

s2 = -0.9517

G =

$$\frac{1}{s^2 + s + 0.046}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 2.3063

s1 = -0.0494

s2 = -0.9506

G =

$$\frac{1}{s^2 + s + 0.047}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 2.2822

s1 = -0.0506

s2 = -0.9494

G =

$$\frac{1}{s^2 + s + 0.048}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 2.2588

s1 = -0.0517

s2 = -0.9483

G =

$$\frac{1}{s^2 + s + 0.049}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 2.2361

s1 = -0.0528

s2 = -0.9472

G =

$$\frac{1}{s^2 + s + 0.05}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 2.2140

s1 = -0.0539

s2 = -0.9461

G =

$$\frac{1}{s^2 + s + 0.051}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 2.1926

s1 = -0.0550

s2 = -0.9450

G =

$$\frac{1}{s^2 + s + 0.052}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 2.1719
s1 = -0.0562
s2 = -0.9438
G =

$$\frac{1}{s^2 + s + 0.053}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 2.1517
s1 = -0.0573
s2 = -0.9427
G =

$$\frac{1}{s^2 + s + 0.054}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 2.1320
s1 = -0.0584
s2 = -0.9416
G =

$$\frac{1}{s^2 + s + 0.055}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 2.1129
s1 = -0.0595
s2 = -0.9405
G =

$$\frac{1}{s^2 + s + 0.056}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 2.0943
s1 = -0.0607
s2 = -0.9393
G =

$$\frac{1}{s^2 + s + 0.057}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 2.0761
s1 = -0.0618
s2 = -0.9382
G =

$$\frac{1}{s^2 + s + 0.058}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 2.0585
s1 = -0.0630
s2 = -0.9370

G =

$$\frac{1}{s^2 + s + 0.059}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 2.0412

s1 = -0.0641

s2 = -0.9359

G =

$$\frac{1}{s^2 + s + 0.06}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 2.0244

s1 = -0.0653

s2 = -0.9347

G =

$$\frac{1}{s^2 + s + 0.061}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 2.0080

s1 = -0.0664

s2 = -0.9336

G =

$$\frac{1}{s^2 + s + 0.062}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.9920
s1 = -0.0676
s2 = -0.9324
G =

$$\frac{1}{s^2 + s + 0.063}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.9764
s1 = -0.0687
s2 = -0.9313
G =

$$\frac{1}{s^2 + s + 0.064}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.9612
s1 = -0.0699
s2 = -0.9301
G =

$$\frac{1}{s^2 + s + 0.065}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.9462

s1 = -0.0710

s2 = -0.9290

G =

$$\frac{1}{s^2 + s + 0.066}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.9317

s1 = -0.0722

s2 = -0.9278

G =

$$\frac{1}{s^2 + s + 0.067}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.9174

s1 = -0.0734

s2 = -0.9266

G =

$$\frac{1}{s^2 + s + 0.068}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.9035

s1 = -0.0746

s2 = -0.9254

G =

$$\frac{1}{s^2 + s + 0.069}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.8898

s1 = -0.0757

s2 = -0.9243

G =

$$\frac{1}{s^2 + s + 0.07}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.8765

s1 = -0.0769

s2 = -0.9231

G =

$$\frac{1}{s^2 + s + 0.071}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.8634

s1 = -0.0781

s2 = -0.9219

G =

$$\frac{1}{s^2 + s + 0.072}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.8506
s1 = -0.0793
s2 = -0.9207
G =

$$\frac{1}{s^2 + s + 0.073}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.8380
s1 = -0.0805
s2 = -0.9195
G =

$$\frac{1}{s^2 + s + 0.074}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.8257
s1 = -0.0817
s2 = -0.9183
G =

$$\frac{1}{s^2 + s + 0.075}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.8137

s1 = -0.0829

s2 = -0.9171

G =

$$\frac{1}{s^2 + s + 0.076}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.8019

s1 = -0.0841

s2 = -0.9159

G =

$$\frac{1}{s^2 + s + 0.077}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.7903

s1 = -0.0853

s2 = -0.9147

G =

$$\frac{1}{s^2 + s + 0.078}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.7789

s1 = -0.0865

s2 = -0.9135

G =

$$\frac{1}{s^2 + s + 0.079}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.7678

s1 = -0.0877

s2 = -0.9123

G =

$$\frac{1}{s^2 + s + 0.08}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.7568

s1 = -0.0889

s2 = -0.9111

G =

$$\frac{1}{s^2 + s + 0.081}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.7461

s1 = -0.0901

s2 = -0.9099

G =

$$\frac{1}{s^2 + s + 0.082}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.7355
s1 = -0.0913
s2 = -0.9087
G =

$$\frac{1}{s^2 + s + 0.083}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.7252
s1 = -0.0926
s2 = -0.9074
G =

$$\frac{1}{s^2 + s + 0.084}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.7150
s1 = -0.0938
s2 = -0.9062
G =

$$\frac{1}{s^2 + s + 0.085}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.7050

s1 = -0.0950

s2 = -0.9050

G =

$$\frac{1}{s^2 + s + 0.086}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.6952

s1 = -0.0963

s2 = -0.9037

G =

$$\frac{1}{s^2 + s + 0.087}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.6855

s1 = -0.0975

s2 = -0.9025

G =

$$\frac{1}{s^2 + s + 0.088}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.6760

s1 = -0.0988

s2 = -0.9012

G =

$$\frac{1}{s^2 + s + 0.089}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.6667

s1 = -0.1000

s2 = -0.9000

G =

$$\frac{1}{s^2 + s + 0.09}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.6575

s1 = -0.1013

s2 = -0.8987

G =

$$\frac{1}{s^2 + s + 0.091}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.6485

s1 = -0.1025

s2 = -0.8975

G =

$$\frac{1}{s^2 + s + 0.092}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.6396
s1 = -0.1038
s2 = -0.8962
G =

$$\frac{1}{s^2 + s + 0.093}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.6308
s1 = -0.1050
s2 = -0.8950
G =

$$\frac{1}{s^2 + s + 0.094}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.6222
s1 = -0.1063
s2 = -0.8937
G =

$$\frac{1}{s^2 + s + 0.095}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
 Model Properties
 chi = 1.6137
 s1 = -0.1076
 s2 = -0.8924
 G =

$$\frac{1}{s^2 + s + 0.096}$$

Continuous-time transfer function.
 Model Properties
 P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
 Model Properties
 chi = 1.6054
 s1 = -0.1088
 s2 = -0.8912
 G =

$$\frac{1}{s^2 + s + 0.097}$$

Continuous-time transfer function.
 Model Properties
 P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
 Model Properties
 chi = 1.5972
 s1 = -0.1101
 s2 = -0.8899
 G =

$$\frac{1}{s^2 + s + 0.098}$$

Continuous-time transfer function.
 Model Properties
 P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
 Model Properties
 chi = 1.5891
 s1 = -0.1114
 s2 = -0.8886

G =

$$\frac{1}{s^2 + s + 0.099}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.5811

s1 = -0.1127

s2 = -0.8873

G =

$$\frac{1}{s^2 + s + 0.1}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.5733

s1 = -0.1140

s2 = -0.8860

G =

$$\frac{1}{s^2 + s + 0.101}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.5656

s1 = -0.1153

s2 = -0.8847

G =

$$\frac{1}{s^2 + s + 0.102}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.5579
s1 = -0.1166
s2 = -0.8834
G =

$$\frac{1}{s^2 + s + 0.103}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.5504
s1 = -0.1179
s2 = -0.8821
G =

$$\frac{1}{s^2 + s + 0.104}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.5430
s1 = -0.1192
s2 = -0.8808
G =

$$\frac{1}{s^2 + s + 0.105}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.5357

s1 = -0.1205

s2 = -0.8795

G =

$$\frac{1}{s^2 + s + 0.106}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.5285

s1 = -0.1218

s2 = -0.8782

G =

$$\frac{1}{s^2 + s + 0.107}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.5215

s1 = -0.1232

s2 = -0.8768

G =

$$\frac{1}{s^2 + s + 0.108}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.5145

s1 = -0.1245

s2 = -0.8755

G =

$$\frac{1}{s^2 + s + 0.109}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.5076

s1 = -0.1258

s2 = -0.8742

G =

$$\frac{1}{s^2 + s + 0.11}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.5008

s1 = -0.1272

s2 = -0.8728

G =

$$\frac{1}{s^2 + s + 0.111}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.4940

s1 = -0.1285

s2 = -0.8715

G =

$$\frac{1}{s^2 + s + 0.112}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.4874
s1 = -0.1299
s2 = -0.8701
G =

$$\frac{1}{s^2 + s + 0.113}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.4809
s1 = -0.1312
s2 = -0.8688
G =

$$\frac{1}{s^2 + s + 0.114}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.4744
s1 = -0.1326
s2 = -0.8674
G =

$$\frac{1}{s^2 + s + 0.115}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.4681

s1 = -0.1339

s2 = -0.8661

G =

$$\frac{1}{s^2 + s + 0.116}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.4618

s1 = -0.1353

s2 = -0.8647

G =

$$\frac{1}{s^2 + s + 0.117}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.4556

s1 = -0.1367

s2 = -0.8633

G =

$$\frac{1}{s^2 + s + 0.118}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.4494

s1 = -0.1381

s2 = -0.8619

G =

$$\frac{1}{s^2 + s + 0.119}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.4434

s1 = -0.1394

s2 = -0.8606

G =

$$\frac{1}{s^2 + s + 0.12}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.4374

s1 = -0.1408

s2 = -0.8592

G =

$$\frac{1}{s^2 + s + 0.121}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.4315

s1 = -0.1422

s2 = -0.8578

G =

$$\frac{1}{s^2 + s + 0.122}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.4257
s1 = -0.1436
s2 = -0.8564
G =

$$\frac{1}{s^2 + s + 0.123}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.4199
s1 = -0.1450
s2 = -0.8550
G =

$$\frac{1}{s^2 + s + 0.124}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.4142
s1 = -0.1464
s2 = -0.8536
G =

$$\frac{1}{s^2 + s + 0.125}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.4086

s1 = -0.1479

s2 = -0.8521

G =

$$\frac{1}{s^2 + s + 0.126}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.4030

s1 = -0.1493

s2 = -0.8507

G =

$$\frac{1}{s^2 + s + 0.127}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.3975

s1 = -0.1507

s2 = -0.8493

G =

$$\frac{1}{s^2 + s + 0.128}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.3921

s1 = -0.1521

s2 = -0.8479

G =

$$\frac{1}{s^2 + s + 0.129}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.3868

s1 = -0.1536

s2 = -0.8464

G =

$$\frac{1}{s^2 + s + 0.13}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.3814

s1 = -0.1550

s2 = -0.8450

G =

$$\frac{1}{s^2 + s + 0.131}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.3762

s1 = -0.1565

s2 = -0.8435

G =

$$\frac{1}{s^2 + s + 0.132}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.3710
s1 = -0.1579
s2 = -0.8421
G =

$$\frac{1}{s^2 + s + 0.133}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.3659
s1 = -0.1594
s2 = -0.8406
G =

$$\frac{1}{s^2 + s + 0.134}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.3608
s1 = -0.1609
s2 = -0.8391
G =

$$\frac{1}{s^2 + s + 0.135}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.3558

s1 = -0.1624

s2 = -0.8376

G =

$$\frac{1}{s^2 + s + 0.136}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.3509

s1 = -0.1638

s2 = -0.8362

G =

$$\frac{1}{s^2 + s + 0.137}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.3460

s1 = -0.1653

s2 = -0.8347

G =

$$\frac{1}{s^2 + s + 0.138}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.3411

s1 = -0.1668

s2 = -0.8332

G =

$$\frac{1}{s^2 + s + 0.139}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.3363

s1 = -0.1683

s2 = -0.8317

G =

$$\frac{1}{s^2 + s + 0.14}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.3316

s1 = -0.1698

s2 = -0.8302

G =

$$\frac{1}{s^2 + s + 0.141}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.3269

s1 = -0.1714

s2 = -0.8286

G =

$$\frac{1}{s^2 + s + 0.142}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.3222
s1 = -0.1729
s2 = -0.8271
G =

$$\frac{1}{s^2 + s + 0.143}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.3176
s1 = -0.1744
s2 = -0.8256
G =

$$\frac{1}{s^2 + s + 0.144}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.3131
s1 = -0.1760
s2 = -0.8240
G =

$$\frac{1}{s^2 + s + 0.145}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
 Model Properties
 chi = 1.3086
 s1 = -0.1775
 s2 = -0.8225
 G =

$$\frac{1}{s^2 + s + 0.146}$$

Continuous-time transfer function.
 Model Properties
 P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
 Model Properties
 chi = 1.3041
 s1 = -0.1791
 s2 = -0.8209
 G =

$$\frac{1}{s^2 + s + 0.147}$$

Continuous-time transfer function.
 Model Properties
 P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
 Model Properties
 chi = 1.2997
 s1 = -0.1806
 s2 = -0.8194
 G =

$$\frac{1}{s^2 + s + 0.148}$$

Continuous-time transfer function.
 Model Properties
 P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
 Model Properties
 chi = 1.2953
 s1 = -0.1822
 s2 = -0.8178

G =

$$\frac{1}{s^2 + s + 0.149}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.2910

s1 = -0.1838

s2 = -0.8162

G =

$$\frac{1}{s^2 + s + 0.15}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.2867

s1 = -0.1854

s2 = -0.8146

G =

$$\frac{1}{s^2 + s + 0.151}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.2825

s1 = -0.1870

s2 = -0.8130

G =

$$\frac{1}{s^2 + s + 0.152}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.2783
s1 = -0.1886
s2 = -0.8114
G =

$$\frac{1}{s^2 + s + 0.153}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.2741
s1 = -0.1902
s2 = -0.8098
G =

$$\frac{1}{s^2 + s + 0.154}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.2700
s1 = -0.1918
s2 = -0.8082
G =

$$\frac{1}{s^2 + s + 0.155}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.2659
s1 = -0.1934
s2 = -0.8066
G =

$$\frac{1}{s^2 + s + 0.156}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.2619
s1 = -0.1950
s2 = -0.8050
G =

$$\frac{1}{s^2 + s + 0.157}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.2579
s1 = -0.1967
s2 = -0.8033
G =

$$\frac{1}{s^2 + s + 0.158}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.2539
s1 = -0.1983
s2 = -0.8017

G =

$$\frac{1}{s^2 + s + 0.159}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.2500

s1 = -0.2000

s2 = -0.8000

G =

$$\frac{1}{s^2 + s + 0.16}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.2461

s1 = -0.2017

s2 = -0.7983

G =

$$\frac{1}{s^2 + s + 0.161}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.2423

s1 = -0.2034

s2 = -0.7966

G =

$$\frac{1}{s^2 + s + 0.162}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.2384
s1 = -0.2050
s2 = -0.7950
G =

$$\frac{1}{s^2 + s + 0.163}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.2347
s1 = -0.2067
s2 = -0.7933
G =

$$\frac{1}{s^2 + s + 0.164}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.2309
s1 = -0.2085
s2 = -0.7915
G =

$$\frac{1}{s^2 + s + 0.165}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
 Model Properties
 chi = 1.2272
 s1 = -0.2102
 s2 = -0.7898
 G =

$$\frac{1}{s^2 + s + 0.166}$$

Continuous-time transfer function.
 Model Properties
 P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
 Model Properties
 chi = 1.2235
 s1 = -0.2119
 s2 = -0.7881
 G =

$$\frac{1}{s^2 + s + 0.167}$$

Continuous-time transfer function.
 Model Properties
 P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
 Model Properties
 chi = 1.2199
 s1 = -0.2136
 s2 = -0.7864
 G =

$$\frac{1}{s^2 + s + 0.168}$$

Continuous-time transfer function.
 Model Properties
 P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
 Model Properties
 chi = 1.2163
 s1 = -0.2154
 s2 = -0.7846

G =

$$\frac{1}{s^2 + s + 0.169}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.2127

s1 = -0.2172

s2 = -0.7828

G =

$$\frac{1}{s^2 + s + 0.17}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.2091

s1 = -0.2189

s2 = -0.7811

G =

$$\frac{1}{s^2 + s + 0.171}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.2056

s1 = -0.2207

s2 = -0.7793

G =

$$\frac{1}{s^2 + s + 0.172}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.2021
s1 = -0.2225
s2 = -0.7775
G =

$$\frac{1}{s^2 + s + 0.173}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.1987
s1 = -0.2243
s2 = -0.7757
G =

$$\frac{1}{s^2 + s + 0.174}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.1952
s1 = -0.2261
s2 = -0.7739
G =

$$\frac{1}{s^2 + s + 0.175}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.1918

s1 = -0.2280

s2 = -0.7720

G =

$$\frac{1}{s^2 + s + 0.176}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.1885

s1 = -0.2298

s2 = -0.7702

G =

$$\frac{1}{s^2 + s + 0.177}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.1851

s1 = -0.2317

s2 = -0.7683

G =

$$\frac{1}{s^2 + s + 0.178}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.1818

s1 = -0.2335

s2 = -0.7665

G =

$$\frac{1}{s^2 + s + 0.179}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.1785

s1 = -0.2354

s2 = -0.7646

G =

$$\frac{1}{s^2 + s + 0.18}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.1753

s1 = -0.2373

s2 = -0.7627

G =

$$\frac{1}{s^2 + s + 0.181}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.1720

s1 = -0.2392

s2 = -0.7608

G =

$$\frac{1}{s^2 + s + 0.182}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.1688
s1 = -0.2412
s2 = -0.7588
G =

$$\frac{1}{s^2 + s + 0.183}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.1656
s1 = -0.2431
s2 = -0.7569
G =

$$\frac{1}{s^2 + s + 0.184}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.1625
s1 = -0.2450
s2 = -0.7550
G =

$$\frac{1}{s^2 + s + 0.185}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.1593

s1 = -0.2470

s2 = -0.7530

G =

$$\frac{1}{s^2 + s + 0.186}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.1562

s1 = -0.2490

s2 = -0.7510

G =

$$\frac{1}{s^2 + s + 0.187}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.1532

s1 = -0.2510

s2 = -0.7490

G =

$$\frac{1}{s^2 + s + 0.188}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.1501

s1 = -0.2530

s2 = -0.7470

G =

$$\frac{1}{s^2 + s + 0.189}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.1471

s1 = -0.2551

s2 = -0.7449

G =

$$\frac{1}{s^2 + s + 0.19}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.1441

s1 = -0.2571

s2 = -0.7429

G =

$$\frac{1}{s^2 + s + 0.191}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.1411

s1 = -0.2592

s2 = -0.7408

G =

$$\frac{1}{s^2 + s + 0.192}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.1381
s1 = -0.2613
s2 = -0.7387
G =

$$\frac{1}{s^2 + s + 0.193}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.1352
s1 = -0.2634
s2 = -0.7366
G =

$$\frac{1}{s^2 + s + 0.194}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.1323
s1 = -0.2655
s2 = -0.7345
G =

$$\frac{1}{s^2 + s + 0.195}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
 Model Properties
 chi = 1.1294
 s1 = -0.2676
 s2 = -0.7324
 G =

$$\frac{1}{s^2 + s + 0.196}$$

Continuous-time transfer function.
 Model Properties
 P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
 Model Properties
 chi = 1.1265
 s1 = -0.2698
 s2 = -0.7302
 G =

$$\frac{1}{s^2 + s + 0.197}$$

Continuous-time transfer function.
 Model Properties
 P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
 Model Properties
 chi = 1.1237
 s1 = -0.2720
 s2 = -0.7280
 G =

$$\frac{1}{s^2 + s + 0.198}$$

Continuous-time transfer function.
 Model Properties
 P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
 Model Properties
 chi = 1.1208
 s1 = -0.2742
 s2 = -0.7258

G =

$$\frac{1}{s^2 + s + 0.199}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.1180

s1 = -0.2764

s2 = -0.7236

G =

$$\frac{1}{s^2 + s + 0.2}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.1152

s1 = -0.2786

s2 = -0.7214

G =

$$\frac{1}{s^2 + s + 0.201}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.1125

s1 = -0.2809

s2 = -0.7191

G =

$$\frac{1}{s^2 + s + 0.202}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.1097
s1 = -0.2832
s2 = -0.7168
G =

$$\frac{1}{s^2 + s + 0.203}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.1070
s1 = -0.2855
s2 = -0.7145
G =

$$\frac{1}{s^2 + s + 0.204}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.1043
s1 = -0.2879
s2 = -0.7121
G =

$$\frac{1}{s^2 + s + 0.205}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.1016

s1 = -0.2902

s2 = -0.7098

G =

$$\frac{1}{s^2 + s + 0.206}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.0990

s1 = -0.2926

s2 = -0.7074

G =

$$\frac{1}{s^2 + s + 0.207}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.0963

s1 = -0.2951

s2 = -0.7049

G =

$$\frac{1}{s^2 + s + 0.208}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.0937

s1 = -0.2975

s2 = -0.7025

G =

$$\frac{1}{s^2 + s + 0.209}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.0911

s1 = -0.3000

s2 = -0.7000

G =

$$\frac{1}{s^2 + s + 0.21}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.0885

s1 = -0.3025

s2 = -0.6975

G =

$$\frac{1}{s^2 + s + 0.211}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.0859

s1 = -0.3051

s2 = -0.6949

G =

$$\frac{1}{s^2 + s + 0.212}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.0834
s1 = -0.3076
s2 = -0.6924
G =

$$\frac{1}{s^2 + s + 0.213}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.0808
s1 = -0.3103
s2 = -0.6897
G =

$$\frac{1}{s^2 + s + 0.214}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.0783
s1 = -0.3129
s2 = -0.6871
G =

$$\frac{1}{s^2 + s + 0.215}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.0758

s1 = -0.3156

s2 = -0.6844

G =

$$\frac{1}{s^2 + s + 0.216}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.0733

s1 = -0.3183

s2 = -0.6817

G =

$$\frac{1}{s^2 + s + 0.217}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.0709

s1 = -0.3211

s2 = -0.6789

G =

$$\frac{1}{s^2 + s + 0.218}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.0684

s1 = -0.3239

s2 = -0.6761

G =

$$\frac{1}{s^2 + s + 0.219}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.0660

s1 = -0.3268

s2 = -0.6732

G =

$$\frac{1}{s^2 + s + 0.22}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.0636

s1 = -0.3297

s2 = -0.6703

G =

$$\frac{1}{s^2 + s + 0.221}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.0612

s1 = -0.3327

s2 = -0.6673

G =

$$\frac{1}{s^2 + s + 0.222}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.0588
s1 = -0.3357
s2 = -0.6643
G =

$$\frac{1}{s^2 + s + 0.223}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.0564
s1 = -0.3388
s2 = -0.6612
G =

$$\frac{1}{s^2 + s + 0.224}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.0541
s1 = -0.3419
s2 = -0.6581
G =

$$\frac{1}{s^2 + s + 0.225}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.0518

s1 = -0.3451

s2 = -0.6549

G =

$$\frac{1}{s^2 + s + 0.226}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.0494

s1 = -0.3483

s2 = -0.6517

G =

$$\frac{1}{s^2 + s + 0.227}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.0471

s1 = -0.3517

s2 = -0.6483

G =

$$\frac{1}{s^2 + s + 0.228}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.0448

s1 = -0.3551

s2 = -0.6449

G =

$$\frac{1}{s^2 + s + 0.229}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.0426

s1 = -0.3586

s2 = -0.6414

G =

$$\frac{1}{s^2 + s + 0.23}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.0403

s1 = -0.3622

s2 = -0.6378

G =

$$\frac{1}{s^2 + s + 0.231}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.0381

s1 = -0.3658

s2 = -0.6342

G =

$$\frac{1}{s^2 + s + 0.232}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.0358
s1 = -0.3696
s2 = -0.6304
G =

$$\frac{1}{s^2 + s + 0.233}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.0336
s1 = -0.3735
s2 = -0.6265
G =

$$\frac{1}{s^2 + s + 0.234}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.0314
s1 = -0.3775
s2 = -0.6225
G =

$$\frac{1}{s^2 + s + 0.235}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.0292

s1 = -0.3817

s2 = -0.6183

G =

$$\frac{1}{s^2 + s + 0.236}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.0271

s1 = -0.3860

s2 = -0.6140

G =

$$\frac{1}{s^2 + s + 0.237}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.0249

s1 = -0.3905

s2 = -0.6095

G =

$$\frac{1}{s^2 + s + 0.238}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.0228

s1 = -0.3951

s2 = -0.6049

G =

$$\frac{1}{s^2 + s + 0.239}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.0206

s1 = -0.4000

s2 = -0.6000

G =

$$\frac{1}{s^2 + s + 0.24}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.0185

s1 = -0.4051

s2 = -0.5949

G =

$$\frac{1}{s^2 + s + 0.241}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.0164

s1 = -0.4106

s2 = -0.5894

G =

$$\frac{1}{s^2 + s + 0.242}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.0143
s1 = -0.4163
s2 = -0.5837
G =

$$\frac{1}{s^2 + s + 0.243}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.0122
s1 = -0.4225
s2 = -0.5775
G =

$$\frac{1}{s^2 + s + 0.244}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.
Model Properties
chi = 1.0102
s1 = -0.4293
s2 = -0.5707
G =

$$\frac{1}{s^2 + s + 0.245}$$

Continuous-time transfer function.
Model Properties
P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.0081

s1 = -0.4368

s2 = -0.5632

G =

$$\frac{1}{s^2 + s + 0.246}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.0061

s1 = -0.4452

s2 = -0.5548

G =

$$\frac{1}{s^2 + s + 0.247}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.0040

s1 = -0.4553

s2 = -0.5447

G =

$$\frac{1}{s^2 + s + 0.248}$$

Continuous-time transfer function.

Model Properties

P =

$$\frac{1}{(s+0.001001)}$$

Continuous-time zero/pole/gain model.

Model Properties

chi = 1.0020

s1 = -0.4684

s2 = -0.5316

```
G =

      1
-----
s^2 + s + 0.249

Continuous-time transfer function.
Model Properties
P =

      1
-----
(s+0.001001)

Continuous-time zero/pole/gain model.
Model Properties
```

Antes de ejecutar el código, procederemos a explicarlo:

- Alpha lo igualamos a 1, ya que para coseguir un sistema de primer orden con ganancia unitaria, necesitamos reducir el orden del sistema usando aproximacion por polos dominantes y la ganancia del sistema original sera la misma del aproximado, luego como alpha es igual a k-beta si se puede igualar a 1.
- El for lo vamos a usar para que nos pruebe distintos valores de beta, en el rango desde -1 hasta 1, y con el if nos aseguramos no crear una funcion de transferencia nula.
- Definimos usando tf la funcion de transferencia del sistema.
- A continuacion usamos if para comprobar si chi es mayor que 1, es decir que el sistema es sobreamortiguado, y si lo es mostramos el valor de chi y de los polos resultantes.
- Como cuando $\chi \gg 1$ podemos descartar el polo mas rapido s2, el sistema queda dominado por s1, es decir un sistema de primer orden con ganancia alpha que es unitaria.
- Y por ultimo, la línea de zpk nos crea el sistema de primer orden deseado.

Ahora, si lo ejecutamos:

Observamos los resultados obtenidos y podemos apreciar que los valores deseados para alpha es 1 y que cuanto mas cerac de 0 este beta mas alto sera el valor de chi, y por lo tanto mayor sera la disparidad entre los 2 polos. Luego nos vamos a quedar con beta = 0.001 ya que da el valor de chi mas alto. El sistema resultante queda:

```
alpha = 1;
beta = 0.001;

G=tf([alpha], [1 1 beta])
```

```
G =

      1
-----
s^2 + s + 0.001

Continuous-time transfer function.
Model Properties
```

```
chi = 1/(2*sqrt(beta))
```

```
chi = 15.8114
```

```
s1 = -chi*sqrt(beta) + sqrt(beta)*sqrt(chi*chi - 1)
```

```
s1 = -0.0010
```

```
s2 = -chi*sqrt(beta) - sqrt(beta)*sqrt(chi*chi - 1)
```

```
s2 = -0.9990
```

```
%Descartamos s2
```

```
P = zpk([], [polo1], alpha)
```

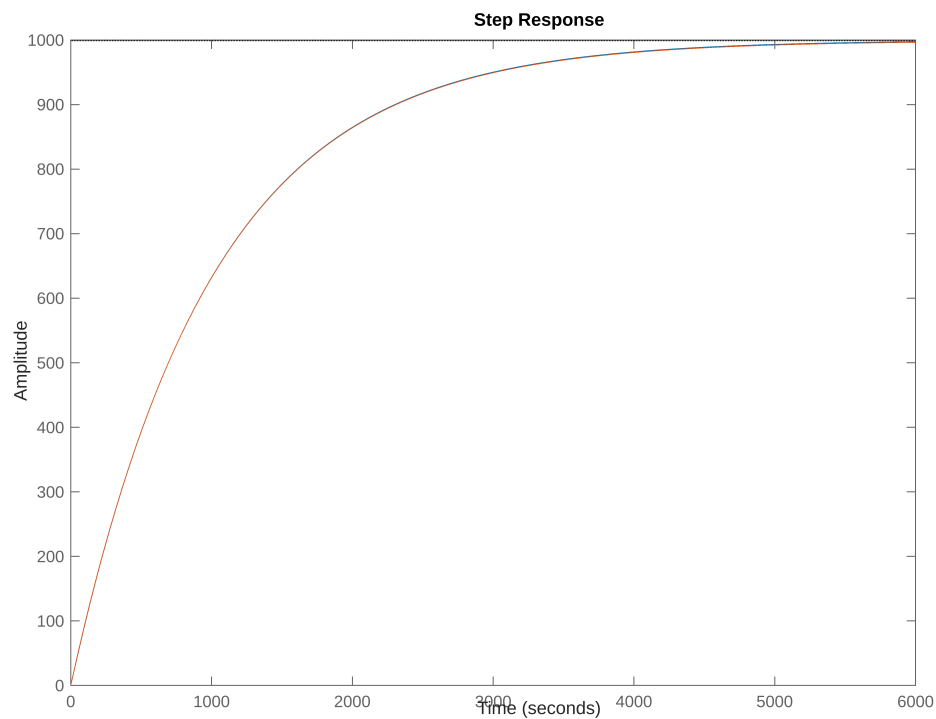
```
P =
```

```
      1  
-----  
(s+0.001001)
```

Continuous-time zero/pole/gain model.
Model Properties

```
% Lo mostramos frente a una entrada escalon
```

```
step(G,P)
```

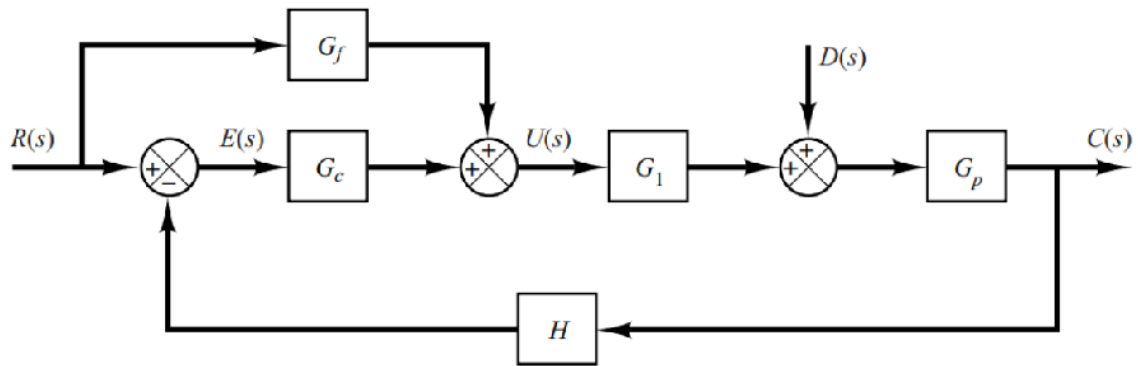


```
% Son muy similares
```

Ejercicio 2 (2,75 puntos). Diagramas de bloques.

Utilizando los comandos `connect` y `sumbk` de MATLAB (véase en Mathworks), construya el diagrama de bloques de la figura para, posteriormente, obtener las funciones de transferencia

$\frac{C(s)}{R(s)}$ y $\frac{C(s)}{D(s)}$ mediante el principio de superposición.



Para ello, considere: $G_c(s) = \frac{5}{s+10}$, $G_f(s) = 25$, $G_1(s) = \frac{25}{s^2+7s+30}$, $G_p(s) = 20$ y $H(s) = s+3$.

```
% Definimos las funciones de cada
```

```
Gc=tf([5],[1 10])
```

```
Gc =
```

```

    5
-----
s + 10

```

```
Continuous-time transfer function.
Model Properties
```

```
Gf=tf(25)
```

```
Gf =
```

```

    25

```

```
Static gain.
Model Properties
```

```
G1=tf([25],[1 7 30])
```

```
G1 =
```

```

    25
-----
s^2 + 7 s + 30

```

```
Continuous-time transfer function.
Model Properties
```

```
Gp=tf(20)
```

```
Gp =
```

```
20
```

```
Static gain.  
Model Properties
```

```
H=tf([1 3],[1])
```

```
H =
```

```
s + 3
```

```
Continuous-time transfer function.  
Model Properties
```

Como es un diagrama con varias entradas, lo que tenemos que aplicar es el teorema de superposición para las entradas, de la siguiente manera:

- **PASO 1:** Configuramos todas las entradas a 0 excepto una.
- **PASO 2:** Reducimos el sistema que queda sólo con la entrada que NO hemos puesto a 0
- **PASO 3:** Calculamos la respuesta a esa entrada
- **PASO 4:** Repetimos con las demás entradas
- **PASO 5:** Sumamos todas las salidas obtenidas para obtener la total

Y, para las entradas, simplemente las calculamos por separado, a ver cuánto vale cada una.

Procedemos de la siguiente manera:

1.SALIDAS D = 0. Quedaría el siguiente sistema:

```
Gc.InputName = "e";  
Gc.OutputName = "uc";  
  
Gf.InputName = "r";  
Gf.OutputName = "uf";  
  
G1.InputName = "u";  
G1.OutputName = "u1";  
  
Gp.InputName = "u1";  
Gp.OutputName = "y";  
  
H.InputName = "y";  
H.OutputName = "yh";  
  
S1 = sumblk("e = r - yh");  
S2 = sumblk("u = uc + uf");  
  
T = connect(Gc,G1,Gf,Gp,H,S1,S2,"r","y");  
Sis1 = tf(T) % Funcion de transferencia resultante 1
```

```
Sis1 =

    From input "r" to output "y":
      1.25e04 s + 1.275e05
    -----
      s^3 + 17 s^2 + 2600 s + 7800

Continuous-time transfer function.
Model Properties
```

2.SALIDAS R = 0. Quedaría el siguiente sistema:

```
Gc.InputName = "e";
Gc.OutputName = "u";

G1.InputName = "u";
G1.OutputName = "u1";

Gp.InputName = "ud";
Gp.OutputName = "y";

H.InputName = "y";
H.OutputName = "yh";

S1 = sumblk("e = -yh");
S2 = sumblk("ud = u1 + d");

T = connect(Gc,G1,Gp,H,S1,S2,"d","y");
Sis2 = tf(T)% Funcion de transferencia resultante 2
```

```
Sis2 =

    From input "d" to output "y":
      20 s^3 + 340 s^2 + 2000 s + 6000
    -----
      s^3 + 17 s^2 + 2600 s + 7800

Continuous-time transfer function.
Model Properties
```

Luego el resultado final sera la suma de ambas:

```
SisTotal= Sis1 + Sis2 % El sistema final se puede simplificar al dividir
entre s^3 + 17 s^2 + 2600 s + 7800
```

```
Warning: Ignoring all input names because of name conflicts.
SisTotal =
```

```
    From input to output "y":
      20 s^6 + 680 s^5 + 72280 s^4 + 1.42e06 s^3 + 4.262e07 s^2 + 4.602e08 s + 1.041e09
    -----
      s^6 + 34 s^5 + 5489 s^4 + 1.04e05 s^3 + 7.025e06 s^2 + 4.056e07 s + 6.084e07

Continuous-time transfer function.
Model Properties
```


Ejercicio 3 (2,5 puntos). Transformadas de Laplace y estudio de la respuesta transitoria de sistemas de control de primer y/o segundo orden.

La respuesta de un motor ante una entrada impulso unitario, $r(t)=\delta(t)$, se describe mediante la siguiente expresión: $y(t) = \left(\frac{3}{20}\right)e^{-t} - \left(\frac{3}{4}\right)e^{-2.9t}$.

```
% Definicion del sistema
syms t;
y = (3*exp(-t)-15*exp(-2.9*t))/20
```

$$y = \frac{3e^{-t}}{20} - \frac{3e^{-\frac{29t}{10}}}{4}$$

- Determinar la función de transferencia del motor, $G(s) = \frac{Y(s)}{R(s)}$, y su respuesta ante escalón unitario, registrando, en una variable, el valor de sobreoscilación y el tiempo de asentamiento.

```
syms s;
% Convertir la salida a Laplace
Y = laplace(y)
```

$$Y = \frac{3}{20(s+1)} - \frac{3}{4\left(s + \frac{29}{10}\right)}$$

```
R = 1;
G = Y / R % La funcion de transferencia es salida entre entrada
```

$$G = \frac{3}{20(s+1)} - \frac{3}{4\left(s + \frac{29}{10}\right)}$$

```
% Convertir la funcion de transferencia resultante a tf para usarla en step.
g = (12*(s+2.9)-60*s -60)/(20*(s+1)*4*(s+2.9))
```

$$g = -\frac{48s + \frac{126}{5}}{(80s + 80)\left(s + \frac{29}{10}\right)}$$

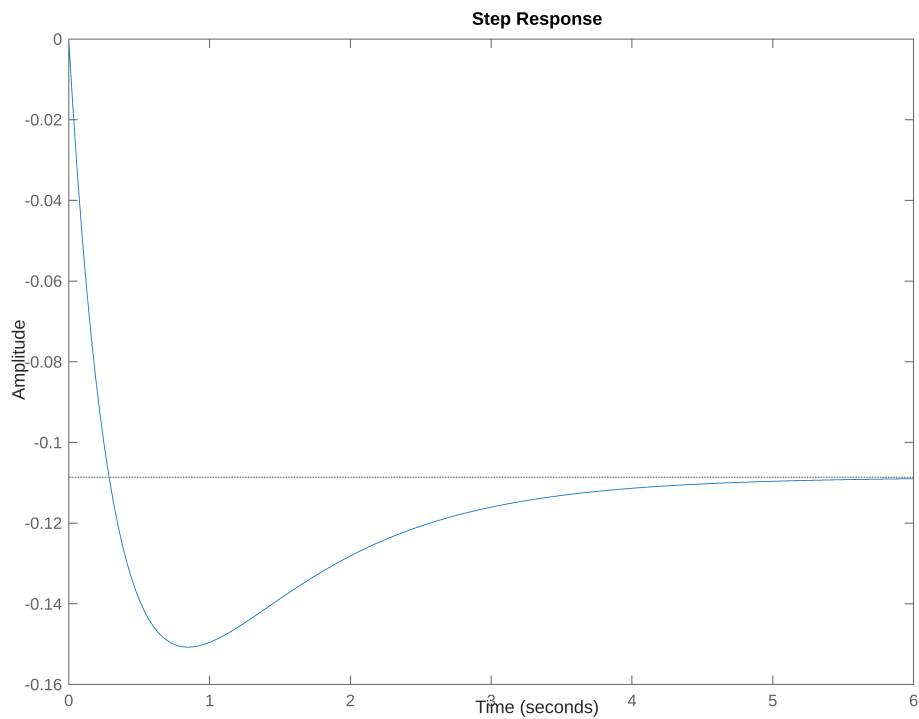
```
% If R is s then use g = tf([12-60 12*2.9-60 0],[80 80+80*2.9 80*2.9])
g = tf([12-60 12*2.9-60],[80 80+80*2.9 80*2.9])
```

g =

$$\frac{-48 s - 25.2}{80 s^2 + 312 s + 232}$$

Continuous-time transfer function.
Model Properties

```
% Uso step para ver su respuesta ante un escalon unitario  
step(g)
```



```
T = stepinfo(g)
```

```
T = struct with fields:  
    RiseTime: 0.2217  
    TransientTime: 4.2344  
    SettlingTime: 4.2344  
    SettlingMin: -0.1507  
    SettlingMax: -0.1012  
    Overshoot: 38.7782  
    Undershoot: 0  
    Peak: 0.1507  
    PeakTime: 0.8575
```

```
Tover = T.Overshoot
```

```
Tover = 38.7782
```

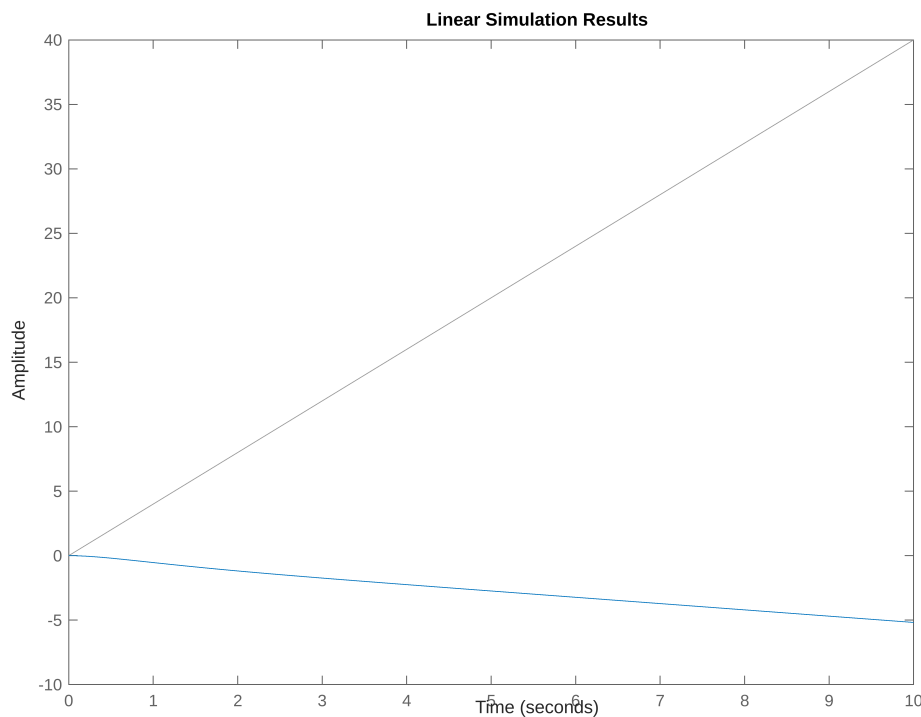
```
Tsett = T.SettlingTime
```

Tsett = 4.2344

- Si el motor se introduce en un esquema con realimentación unitaria negativa, represente la respuesta del sistema realimentado ante una entrada rampa, $r(t)=4t$.

```
% Declaración de la entrada rampa de pendiente 4
syms t;
t = linspace(0,10,100);
rampa = 4*t;

% Uso la funcion de transferencia calculada anteriormente para ver su
% respuesta
lsim(feedback(g,1), rampa,t)
```



Ejercicio 4 (2,75 puntos). Respuesta transitoria, precisión y error en estado estacionario para sistemas de orden superior.

Obtenga la respuesta, ante rampa unitaria, de un siguiente sistema de control en lazo cerrado, cuya función de transferencia es: $G(s) = \frac{s + 10}{s^3 + 6s^2 + 9s + 10}$. Realice un análisis analítico y gráfico. ¿Se puede despreciar algún polo (aproximación por polos dominantes) con el fin de reducir el orden del sistema? Con el análisis previo, analice los resultados desde un punto de vista del error y el tipo de sistema. Finalmente, exponga un mismo

análisis, pero ahora considerando una entrada exponencial, $r(t) = e^{-\frac{t}{2}}$. ¿Qué tipo de respuesta transitoria y estacionaria resulta?

```
% Definición de la función de transferencia
G = tf([1 10],[1 6 9 10])
```

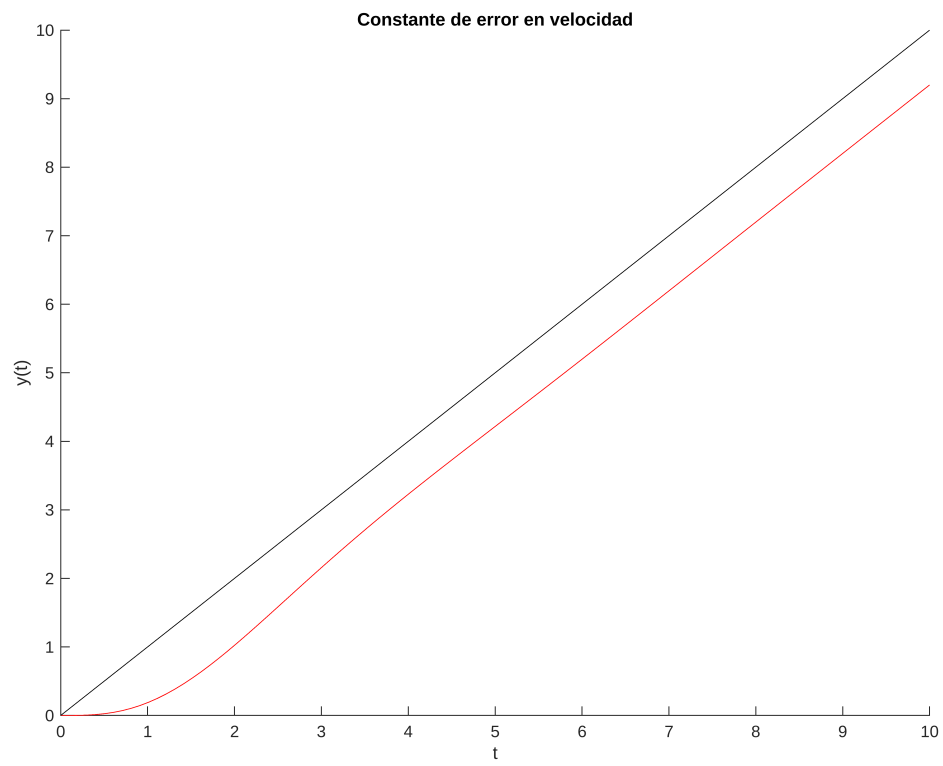
G =

$$\frac{s + 10}{s^3 + 6s^2 + 9s + 10}$$

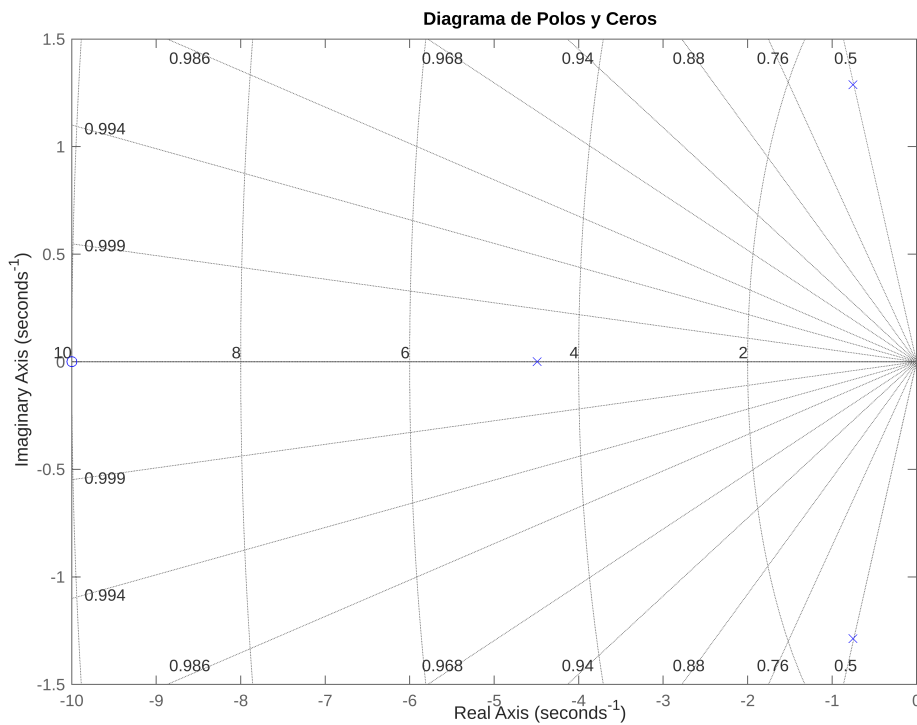
Continuous-time transfer function.
Model Properties

```
% Respuesta del sistema a una rampa unitaria
t = linspace(0, 10, 100);
rampa = t;
salida_rampa = lsim(G, rampa, t);

figure; hold on;
plot(t, salida_rampa, "-red");
plot(t,t,"-black");
title('Constante de error en velocidad');
ylabel('y(t)');
xlabel('t');
hold off;
```



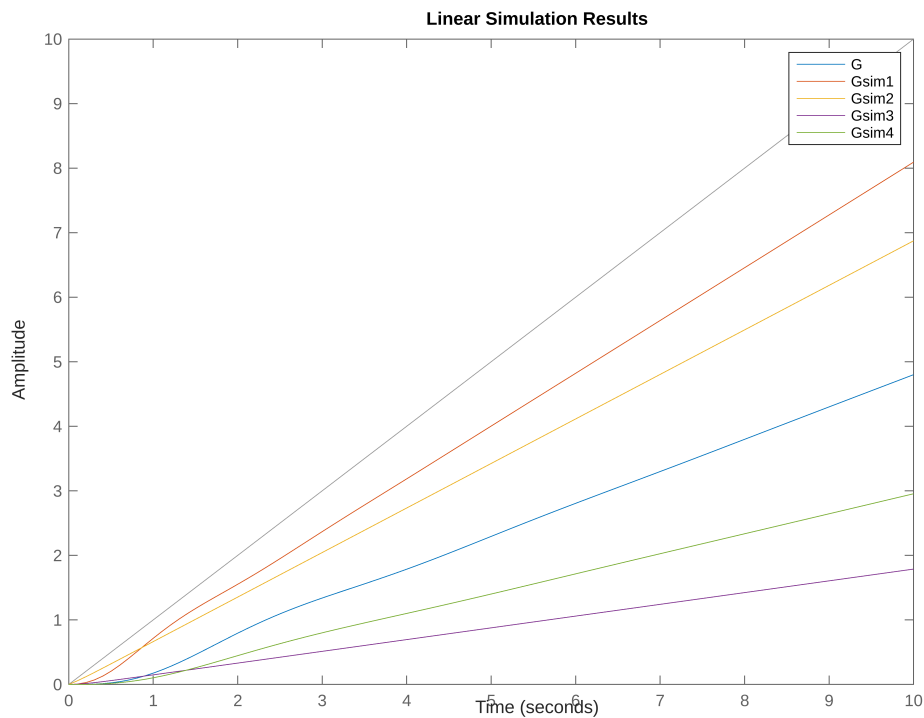
```
% Análizamos los polos y los ceros del sistema  
pzmap(G, "-b");  
grid on;  
title('Diagrama de Polos y Ceros');
```



```
[polos, ceros] = pzmap(G)
```

```
polos = 3x1 complex
    -4.4920 + 0.0000i
    -0.7540 + 1.2875i
    -0.7540 - 1.2875i
ceros = -10
```

```
% No se puede despreciar ningun polo como se puede apreciar
Gsim1 = zpk([-10], [-1183/1569+2566/1993i -1183/1569-2566/1993i],1);
Gsim2 = zpk([-10], [-2255/502],1);
Gsim3 = zpk([], [-2255/502],1);
Gsim4 = zpk([], [-1183/1569+2566/1993i -1183/1569-2566/1993i],1);
figure; hold on;
lsim(feedback(G,1), rampa,t)
lsim(feedback(Gsim1,1), rampa,t)
lsim(feedback(Gsim2,1), rampa,t)
lsim(feedback(Gsim3,1), rampa,t)
lsim(feedback(Gsim4,1), rampa,t)
legend('G', 'Gsim1', 'Gsim2', 'Gsim3', 'Gsim4');hold off;
```



```
% Análisis del error y el tipo de sistema
```

```
Kp = limit((s+10)/(s^3+6*s^2+9*s+10), s, 0)
```

```
Kp = 1
```

```
Kv = limit(((s+10)/(s^3+6*s^2+9*s+10))*s, s, 0)
```

```
Kv = 0
```

```
Ka = limit(((s+10)/(s^3+6*s^2+9*s+10))*s^2, s, 0)
```

```
Ka = 0
```

```
% Viendo estos resultados sabemos que el sistema es de tipo 0
```

```
error_salto = 1/(1+Kp)
```

```
error_salto =
```

$$\frac{1}{2}$$

```
error_rampa = Inf
```

```
error_rampa = Inf
```

```
error_parabola = Inf
```

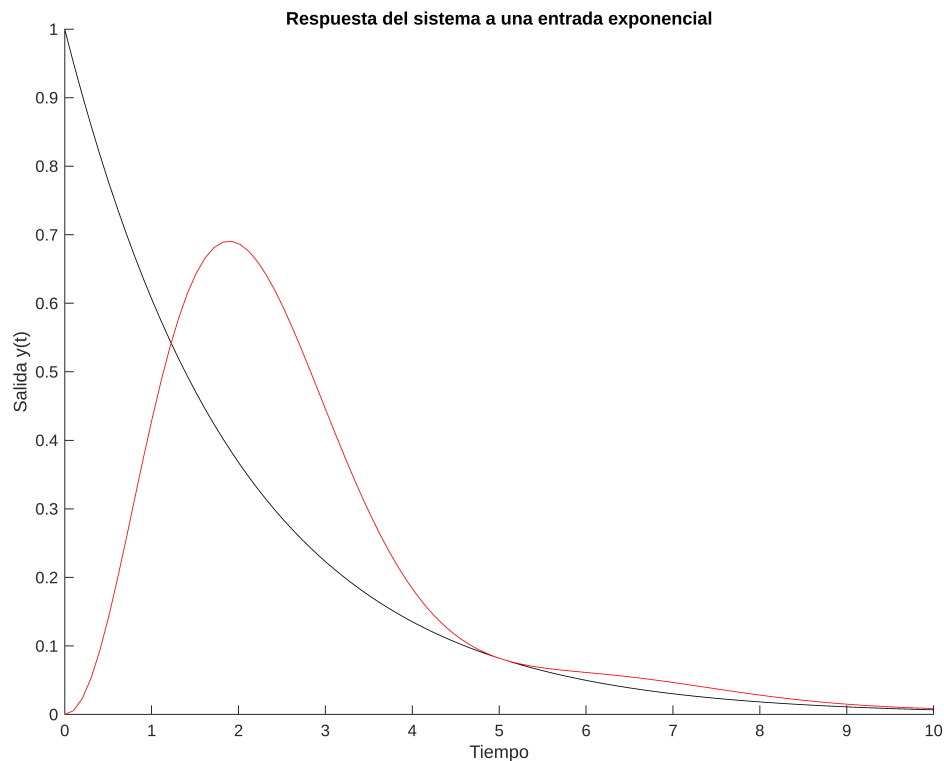
```
error_parabola = Inf
```

```

% Respuesta del sistema a una entrada exponencial
exp_input = exp(-t/2);
[y_exp, t_exp] = lsim(G, exp_input, t);

figure;hold on;
plot(t,exp_input,"-black")
plot(t_exp, y_exp,"-red");
title('Respuesta del sistema a una entrada exponencial');
xlabel('Tiempo');
ylabel('Salida y(t)');
hold off;

```



```

%Para calcular el error transformamos la exponencial usando laplace
syms t s
R = laplace(exp(-t/2));
G = (s+10)/(s^3+6*s^2+9*s+10);

%Usando la formula general del error calculamos el error que varía con el
%tiempo
E = R/(1+G);

```