UNIVERSIDAD FIDÉLITAS

SEDE HEREDIA

CONTROL AUTOMÁTICO

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TAREA # 2

SISTEMAS DE SEGUNDO ORDEN

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$$G0 = \frac{3}{S^2 + 2S + 1}$$

$$= \frac{\frac{3}{S^2 + 2S + 1}}{1 + \frac{3}{S^2 + 2S + 1}}$$

$$= \frac{\frac{3}{S^2 + 2S + 1}}{\frac{S^2 + 2S + 1 + 3}{S^2 + 2S + 1}}$$

$$= \frac{3}{S^2 + 2S + 4}$$

$$\frac{Wn^2}{S^2 + 2\xi Wns + Wn^2}$$

$$\frac{3}{4} * \frac{4}{S^2 + 2S + 4}$$

Wn = 2

$2\xi Wns$= 2

$\xi = \frac{1}{2}$

W = 2 $* \sqrt{1 - \left(\frac{1}{2}\right)^2}$ = 1,73

α = Wn $* \xi$ = 1

P_1 = -1 + 1,73

P_2 = -1 – 1,73

Z = 0

Comprobación con MatLab

```
>> num= 3;
>> den= [1 2 1];
>> G = tf(num,den)

G =

      3
 -------------
 s^2 + 2 s + 1

Continuous-time transfer function.

>> num1 = 1;
>> den1 = 1;
>> H = te(num1,den1)
Undefined function or variable 'te'.

>> H = tf(num1,den1)

H =

  1

Static gain.

>> F=feedback(G,H)

F =

      3
 -------------
 s^2 + 2 s + 4

Continuous-time transfer function.

>> [z,p,k]=tf2zp([3],[1 2 4])

z =

  0×1 empty double column vector
```

p =

-1.0000 + 1.7321i
-1.0000 - 1.7321i

k =

3