

Práctica 4 Electrónica

Lázaro Cepas González - DNI: 77874176V

1. Parámetros:

$Rr': 0.5 \Omega$

$Lr': 2.5 \text{ mH}$

$Rs: 0.75 \Omega$

$Ls: 2.5 \text{ mH}$

$Lm: 92 \text{ mH}$

$D: 0.02$

2. Ecuación diferencial

$$Z_{eq} = \frac{230 \cdot 10^{-6} s^2 + 25 \cdot 92 \cdot 10^{-3} s + (0.75 + 2.5 \cdot 10^{-3} s) \cdot (94.5 \cdot 10^{-3} s + 25)}{(94.5 \cdot 10^{-3} s + 25)}$$

$$Z_{eq} = \frac{0.00023 s^2 + 2.3 s + (0.75 + 0.0025 s) \cdot (0.0945 s + 25)}{0.0945 s + 25}$$

$$Z_{eq} = \frac{0.00023 s^2 + 2.3 s + 0.70875 s + 18.75 + 0.00023625 s^2 + 0.0625 s}{0.0945 s + 25}$$

$$Z_{eq} = \frac{0.00046625 s^2 + 3.07125 s + 18.75}{0.0945 s + 25}$$

$$V_s = I_s \cdot Z_{eq} ; \quad G = \frac{I_s}{V_s} \rightarrow G = \frac{1}{Z_{eq}} :$$

$$\left[G(s) = \frac{0.0945 s + 25}{0.00046625 s^2 + 3.07125 s + 18.75} \right]$$

3. Modelo del sistema

```
>> G=tf([0.0945 25],[0.000466625 3.07125 18.75])
```

```
G =
```

```

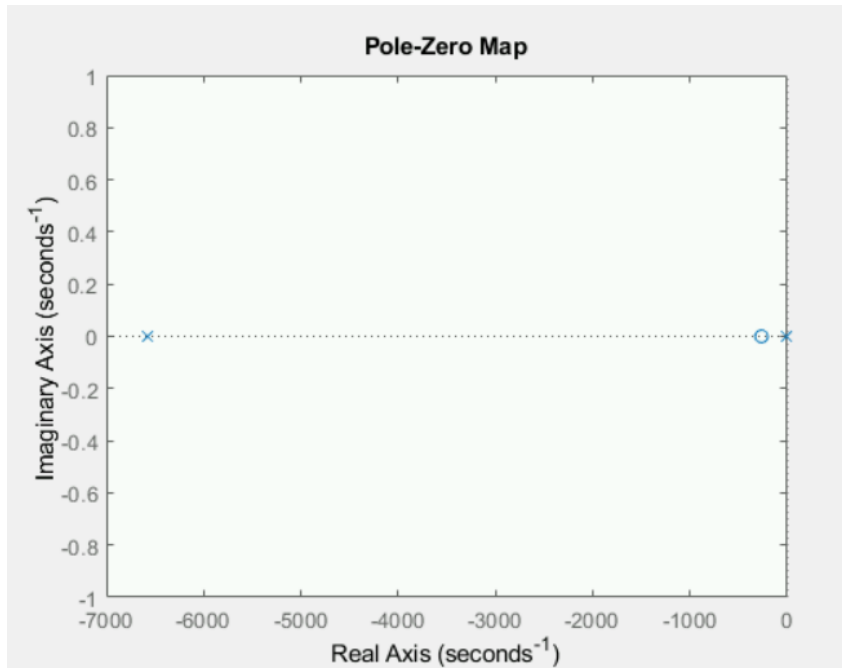
      0.0945 s + 25
-----
0.0004666 s^2 + 3.071 s + 18.75

```

```
Continuous-time transfer function.
```

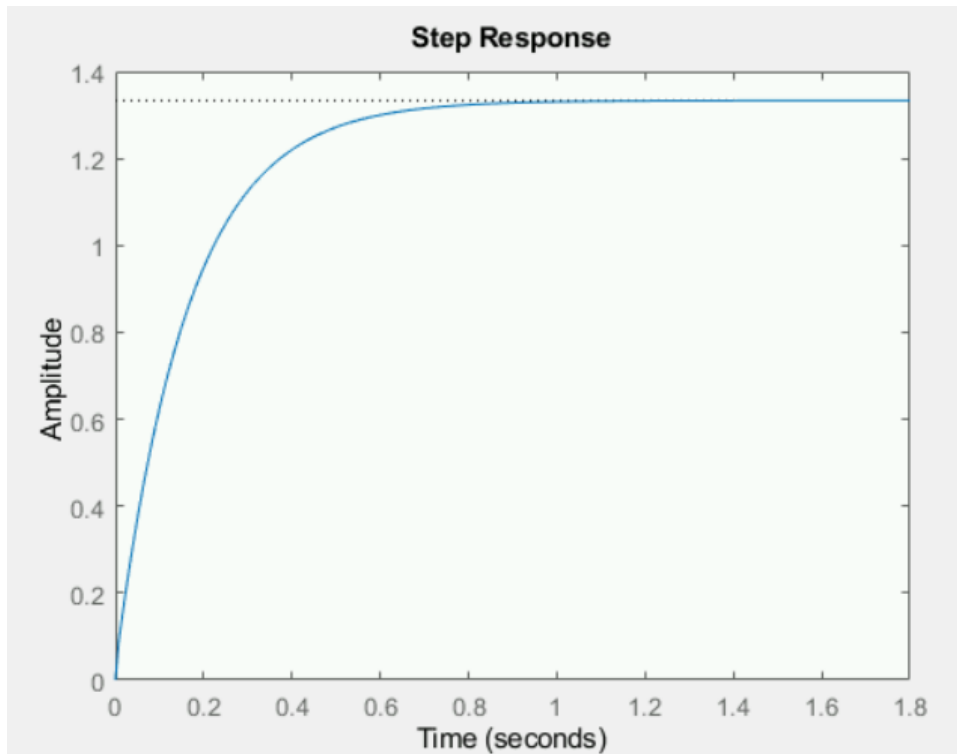
4. Polos y ceros del sistema

Using the command “pzmap(G)” in Matlab



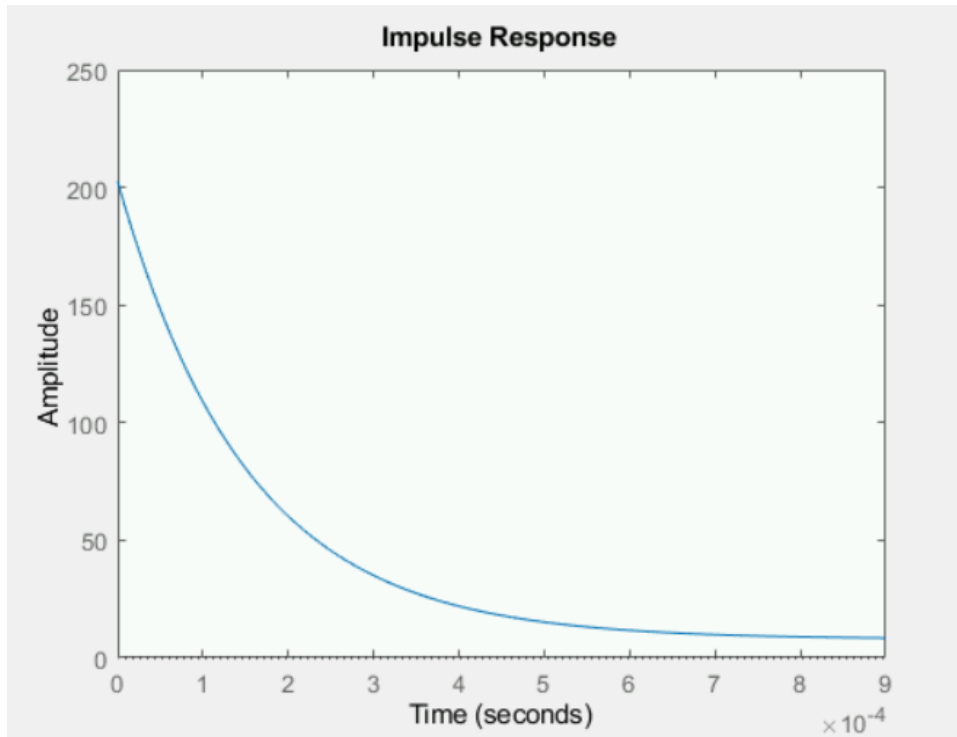
5. Ganancia estática

Using the command “step(G)” in Matlab:



6. Respuesta al impulso

Using the command “impulse(G)” in Matlab:



7. Tiempo de subida

```
>> r=step(G)
```

```
r =
```

0
0.0883
0.1443
0.1978
0.2489
0.2977
0.3443

```
>> [r,t]=step(G)
```

```
r =
```

```
0
0.0883
0.1443
0.1978
0.2489
0.2977
0.3443
0.3889
```

```
t
```

```
t =
```

```
0
0.0075
0.0151
0.0226
0.0301
0.0377
0.0452
0.0528
0.0603
```

```
>> find(abs(r-(25/18.75)*0.05)<=0.05,1)
```

```
ans =
```

```
2
```

```
>> t(2)
```

```
ans =
```

```
0.0075
```

```
>> find(abs(r-(25/18.75)*0.95)<=0.05,1)
```

```
ans =
```

```
54
```

```
>> t(54)
```

```
ans =
```

```
0.3994
```

8. Entrada senoidal
9. Modelo simplificado de orden 1
10. Diagrama de Bode