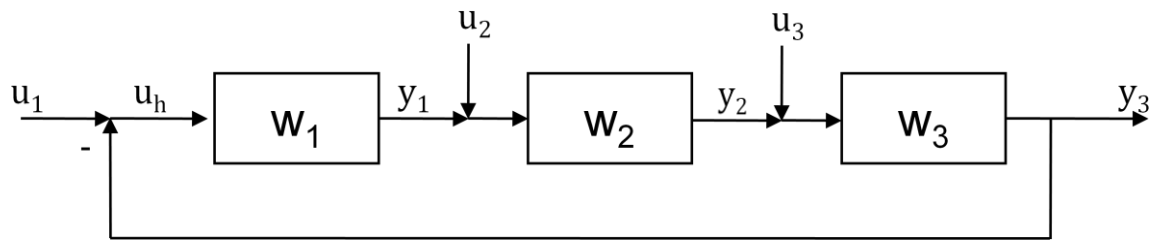


Gyakorló feladatok

Hatásvázlatok átalakítása



$$y_3/u_1 = w_0/(1+w_0) \quad y_3/u_2 = w_2w_3/(1+w_0) \quad y_2/u_1 = w_1w_2/(1+w_0) \quad u_h/u_3 = -w_3/(1+w_0)$$

Átviteli függvény:

1.

$$w(s) = \frac{1}{(s+1)}$$

Mekkora a fenti rendszer $a_{[dB]}(\omega)$ erősítése és $\varphi(\omega)$ fázistolása $\omega = 1$ rad/s körfrekvencián?

$$abs\{w(j\omega)\} = ?$$

$$arc\{w(j\omega)\} = ?$$

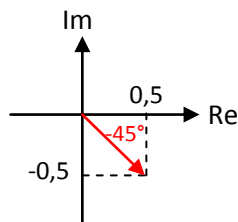
$s = j\omega$ helyettesítéssel:

$$w(j\omega) |_{\omega=1} = \frac{1}{(j+1)} = \frac{1}{(j+1)} \frac{(1-j)}{(1-j)} = \frac{1-j}{1^2+1^2} = 0,5 - j0,5$$

$$abs(0,5 - j0,5) = 0,7071$$

$$a_{[dB]}(\omega) = 20 \lg(0,7071) = -3dB$$

$$arc(0,5 - j0,5) = -45^\circ$$



2.

$$w(s) = \frac{s}{(s+1)}$$

Mekkora a fenti rendszer $a_{[dB]}(\omega)$ erősítése és $\varphi(\omega)$ fázistolása $\omega = 2$ rad/s körfrekvencián?

$$w(j\omega) |_{\omega=2} = \frac{2j}{(2j+1)} = \frac{2j}{(2j+1)} \frac{(1-2j)}{(1-2j)} = \frac{2j+4}{2^2+1^2} = 0,8 + j0,4$$

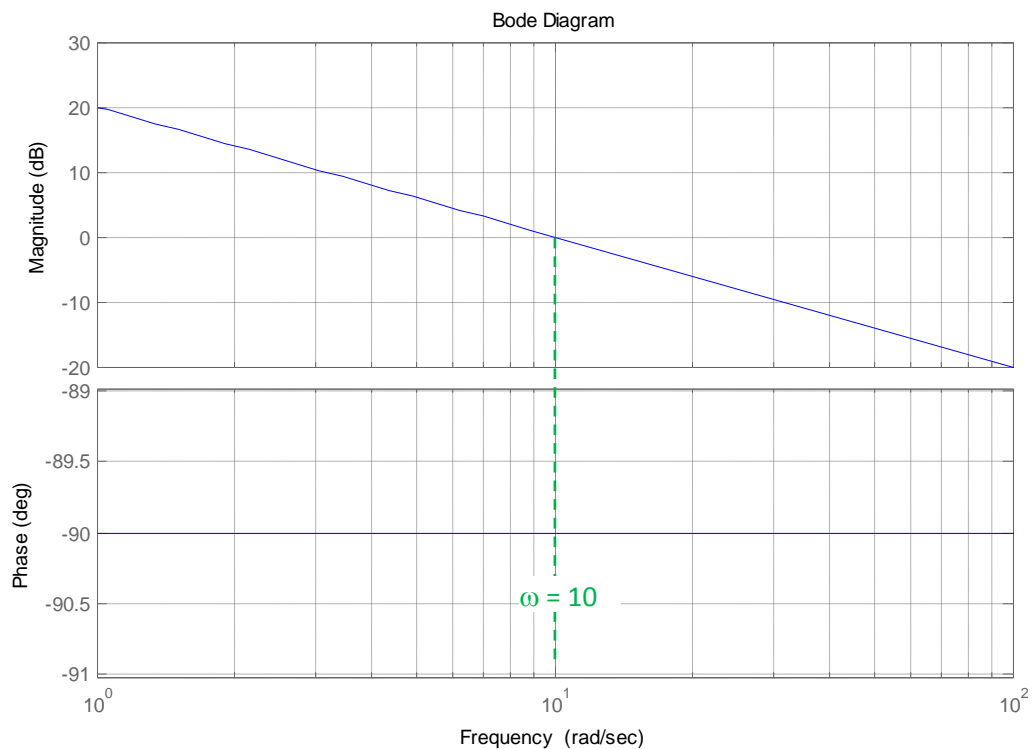
$$\text{abs}(0,8 + j0,4) = 0,8944$$

$$a_{[dB]}(\omega) = 20 \lg(0,8944) = -0,97\text{dB}$$

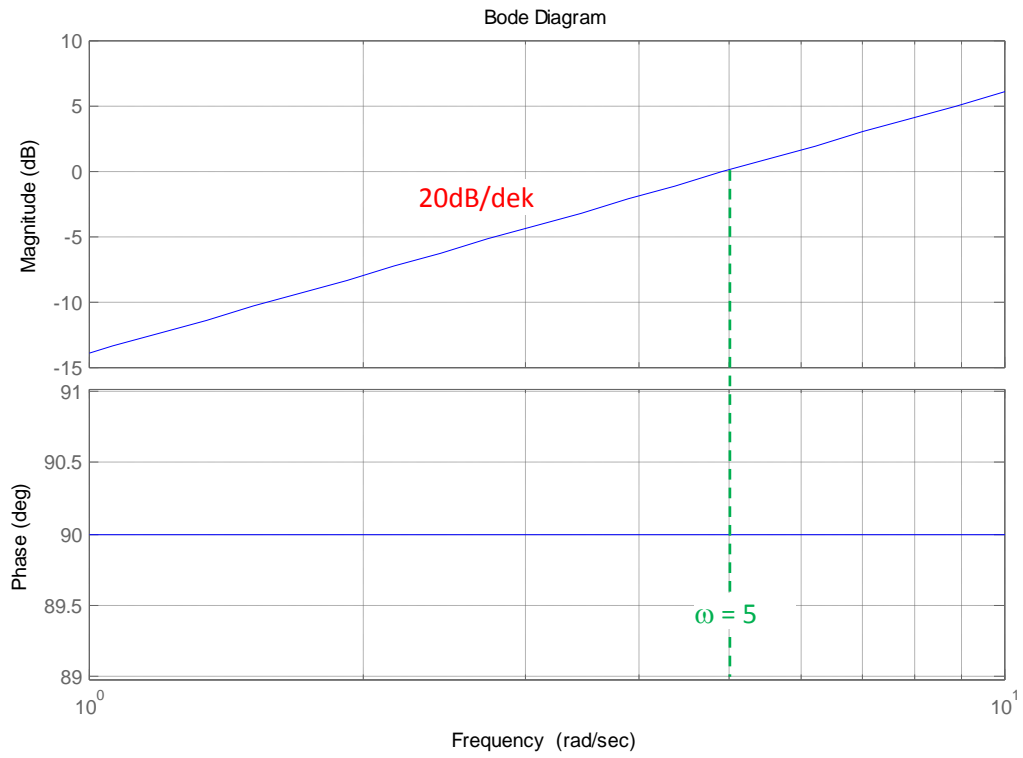
$$\text{arc}(0,8 + j0,4) = 26,56^\circ$$

Bode diagram

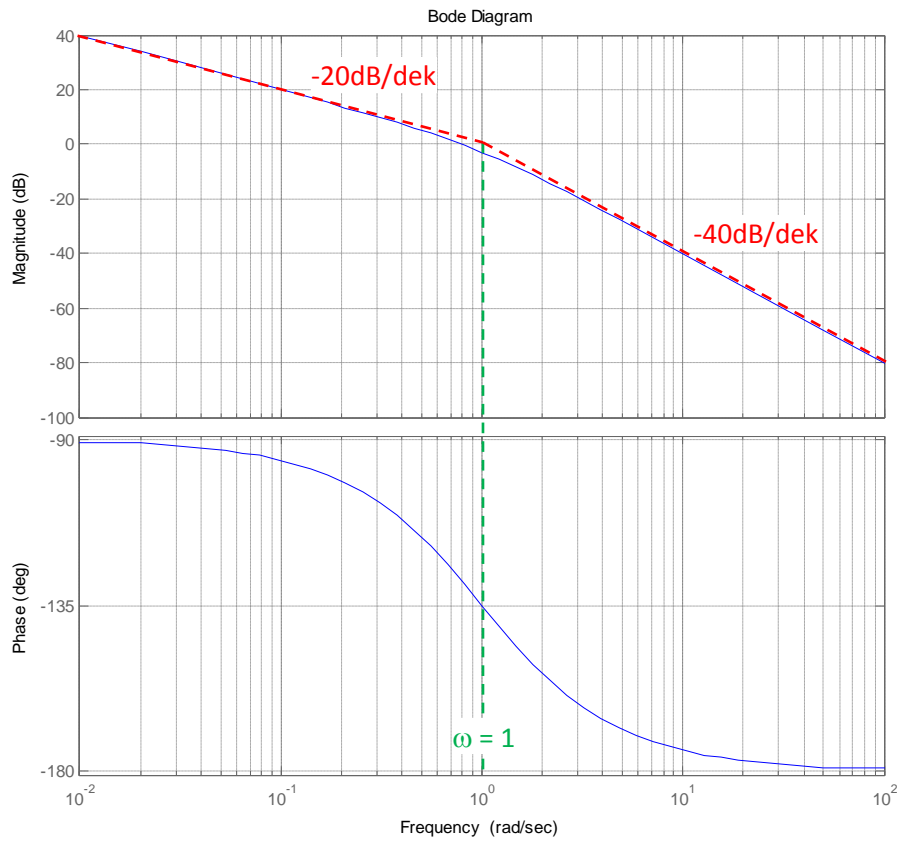
1. $w(s) = \frac{10}{s} = \frac{1}{T_s} = \frac{1}{0,1s} \quad T = 0,1 \rightarrow \omega = 10$



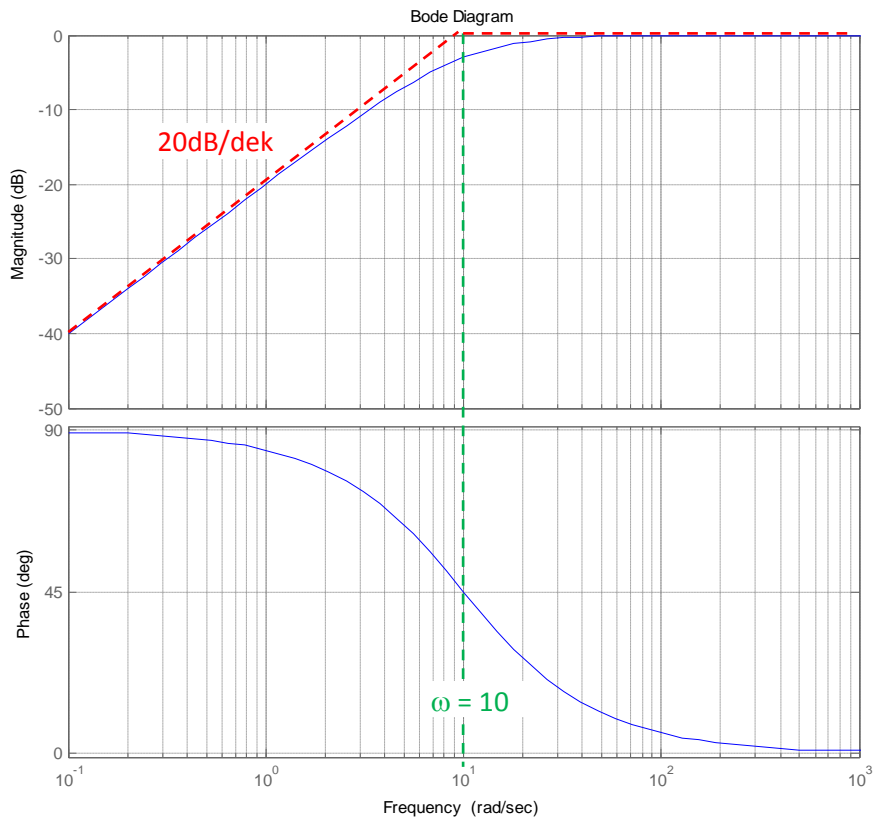
2. $w(s) = 0,2s \quad \tau = 0,2 \rightarrow \omega = 5$



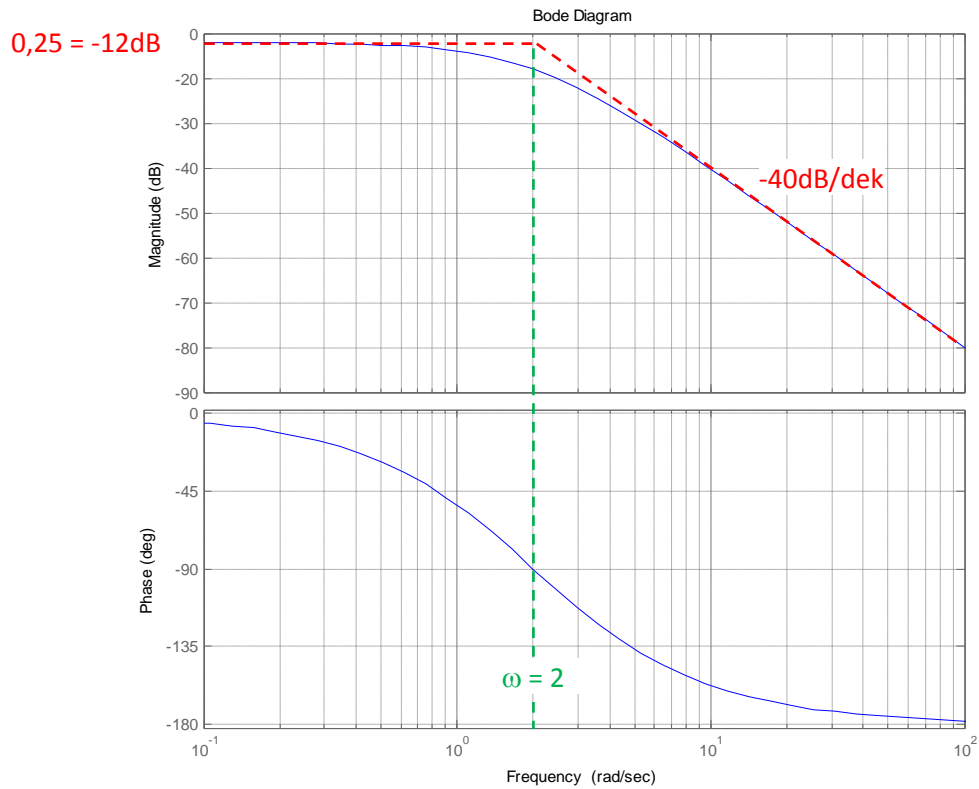
3. $w(s) = \frac{1}{s(s+1)} = \frac{1}{sT_1} \cdot \frac{1}{(sT_2+1)} \quad T_1 = T_2 = 1$



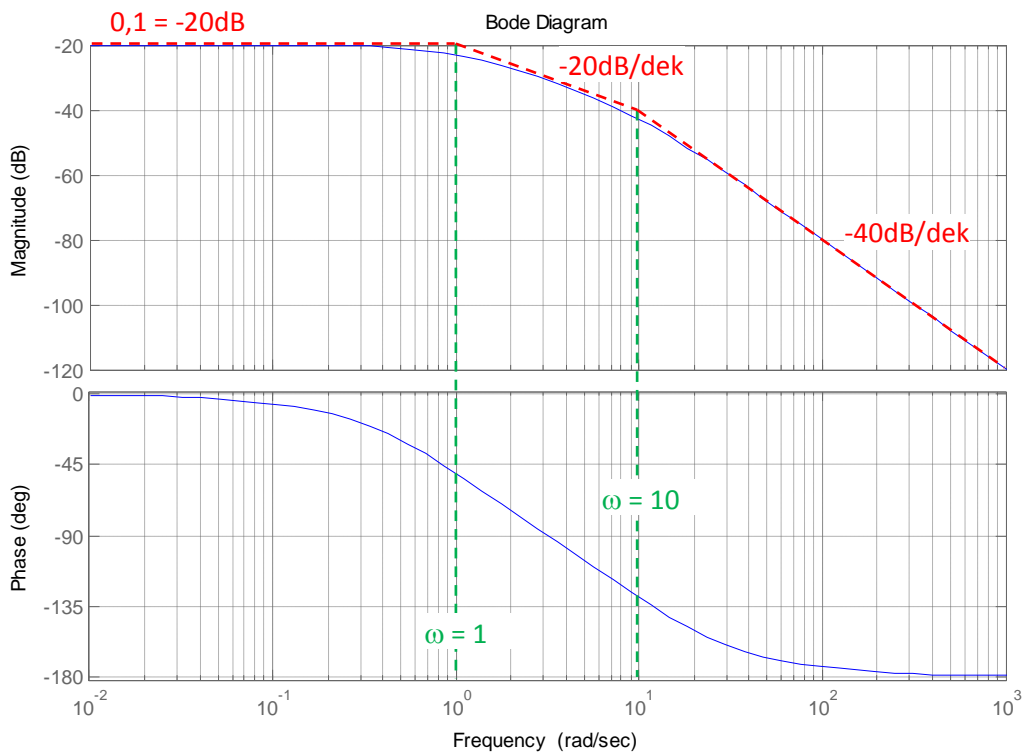
$$4. \quad w(s) = \frac{s}{s+10} = \frac{0,1s}{0,1s+1} \quad \tau = T = 1$$



$$5. \quad w(s) = \frac{1}{(s+2)^2} = \frac{0,25}{(0,5s+1)(0,5s+1)}$$



$$6. \quad w(s) = \frac{1}{(s+1)(s+10)} = \frac{0,1}{(s+1)(0,1s+1)}$$



$$7. \quad w(s) = \frac{(s+1)}{(s+5)(s+20)} = \frac{1}{100} \cdot \frac{(s+1)}{(0,2s+1)(0,05s+1)} \quad \tau = 1 \quad T_1 = 0,2 \quad T_2 = 0,05$$

