Soit $T_1(j\omega) = 4 + 2j\omega$

$$T_2(j\omega) = \frac{10}{9 + 3j\omega}$$

$$T_3(j\omega) = RCj\omega$$

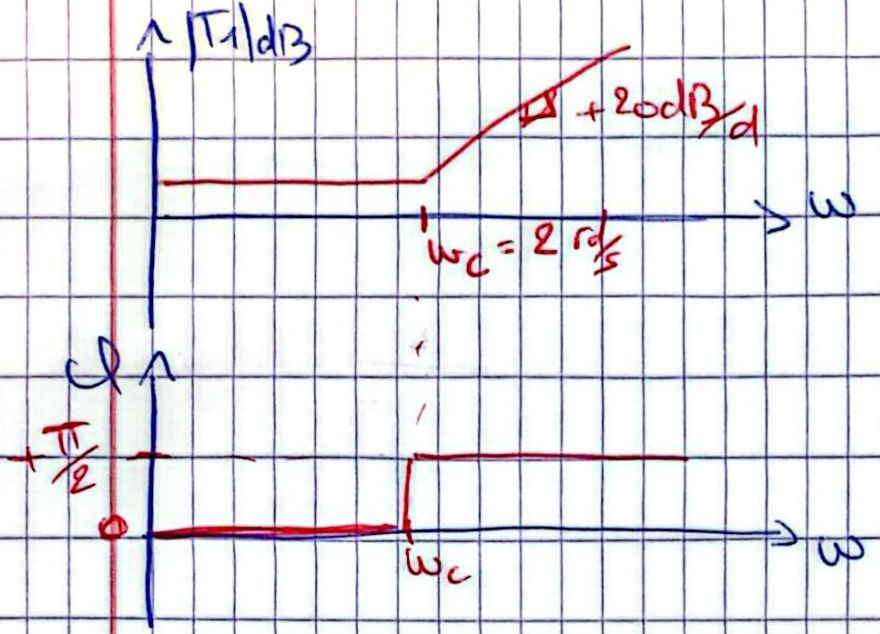
Tracer les diagrammes de Bode de : $T_1(j\omega)$; $T_2(j\omega)$; $T_1(j\omega) \times T_2(j\omega)$; $T_2(j\omega) / T_1(j\omega)$;

$T_1(j\omega) \times T_2(j\omega) \times T_3(j\omega)$; $T_1(j\omega) \times T_2(j\omega) / T_3(j\omega)$

Correction :

constante = gain qui ne change pas l'allure de Bode

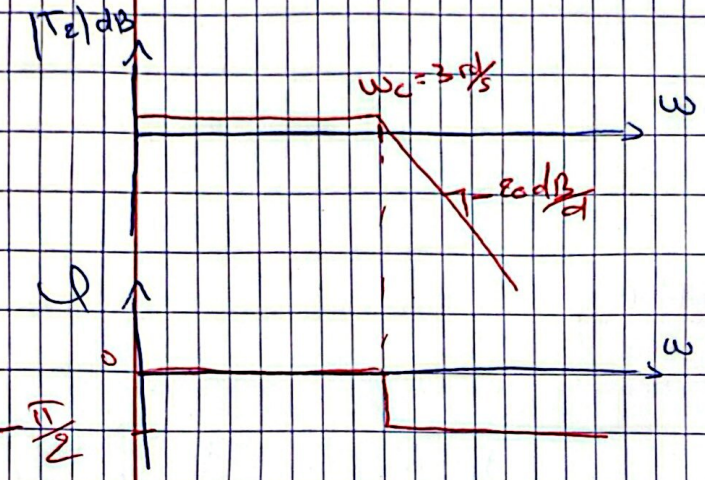
$$T_1(j\omega) = 4 + 2j\omega = \textcircled{4}\left(1 + \frac{2}{4}j\omega\right) \Rightarrow \boxed{\omega_c = \frac{4}{2}\,rd/s = 2\,rd/s}$$



constante = gain qui ne change pas d'allure

$$T_2(j\omega) = \frac{10}{9 + 3j\omega} = \frac{10}{9\left(1 + \frac{3}{9}j\omega\right)} = \left(\frac{10}{9}\right) \times \frac{1}{1 + \frac{3}{9}j\omega}$$

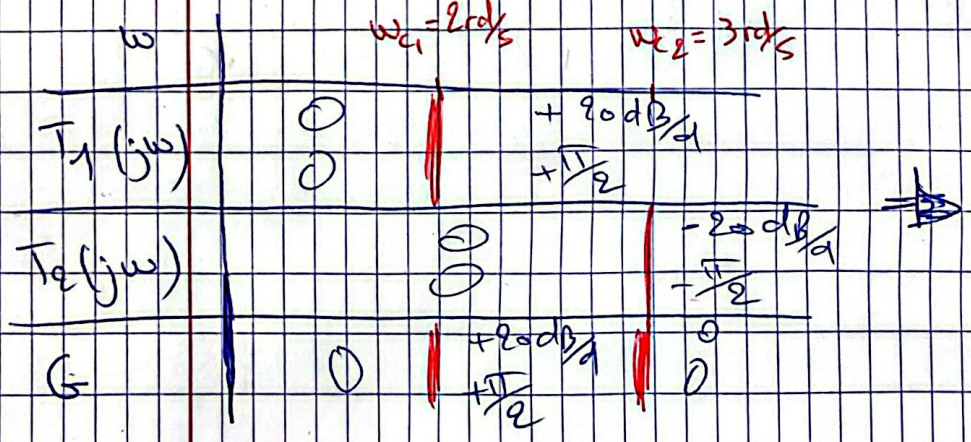
$$\omega_c = \frac{9}{3} = 3\,rd/s$$

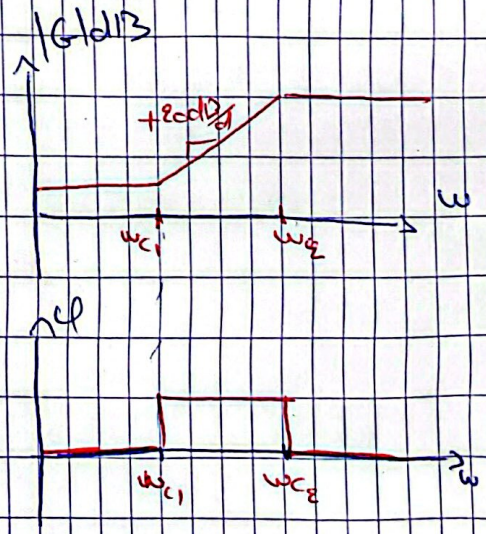


soit $G = T_1(j\omega) \times T_2(j\omega)$

$$\leftrightarrow 20\log(|G|) = 20\log(|T_1| \times |T_2|) = 20\log(|T_1|) + 20\log(|T_2|)$$

$$\leftrightarrow |G|_{dB} = |T_1|_{dB} + |T_2|_{dB}$$





soit $F(j\omega) = \frac{T_2(j\omega)}{T_1(j\omega)} = \frac{\frac{10}{9+3j\omega}}{4+2j\omega} = \frac{10}{9+3j\omega} \times \frac{1}{4+2j\omega}$

$= \frac{10}{9} \times \frac{1}{(1+\frac{3}{9}j\omega)} \times \frac{1}{4(1+\frac{2}{4}j\omega)}$

$= \frac{10}{9\times 4} \times \frac{1}{(1+\frac{3}{9}j\omega)} \times \frac{1}{(1+\frac{2}{4}j\omega)}$

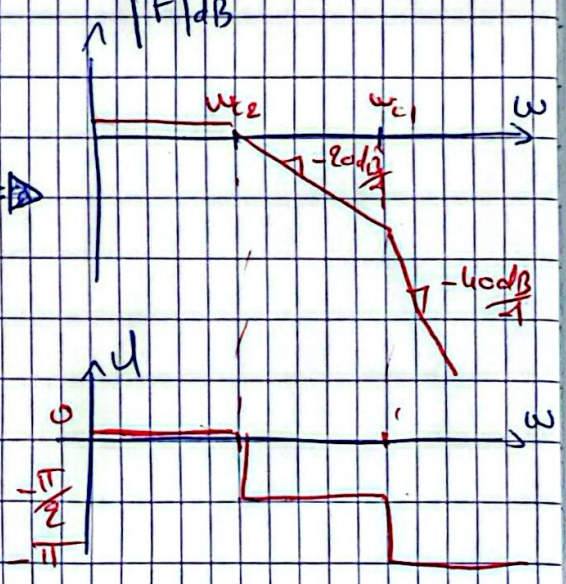
gain

⇒ on a deux pulsations de coupures : $\omega_{c_1} = \frac{9}{3} = 3 rd/s$

et $\omega_{c_2} = \frac{4}{2} = 2 rd/s$

	ω	ω_{c_2}	$\omega_{c_1}=3rd/s$
$T_2 = \frac{10/9}{1+\frac{3}{9}j\omega}$	0		$-20dB/d$
	0		$-\pi/2$
$\frac{1}{T_1} = \frac{1}{4(1+\frac{2}{4}j)}$	0	$-20dB/d$	
	0	$-\pi/2$	
$F(j\omega)$	0	$-20dB/d$	$-40dB/d$
	0	$-\pi/2$	$-\pi$

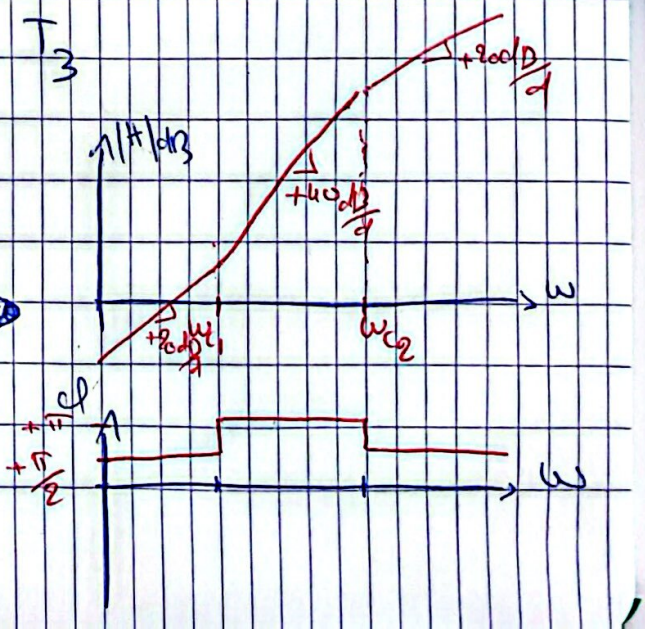
⇒



$H(j\omega) = T_1 \times T_2 \times T_3 = G \times T_3$

	ω	$\omega_{c_1}=2rd/s$	$\omega_{c_2}=3rd/s$
G	0	$+20dB/d$	0
	0	$+\pi/2$	0
T_3		$+20dB/d$	
		$+\pi/2$	
H	$+20dB/d$	$+40dB/d$	$+20dB/d$
	$+\pi/2$	$+\pi$	$+\pi/2$

⇒



$$I(j\omega) = T_1 \times T_2 / T_3 = \overbrace{T_1 \times T_2}^{G} \times \frac{1}{T_3}$$

ω		$\omega_{c1} = 2$ rd/s		$\omega_{c2} = 3$ rd/s	
G	0		$+20$ dB/d		0
	0		$+\pi/2$		0
$\frac{1}{T_3} = \frac{1}{RCj\omega}$			-20 dB/d		
			$-\pi/2$		
$I(j\omega)$	-20 dB/d		0		-20 dB/d
	$-\pi/2$		0		$-\pi/2$

$\Rightarrow$