

Tarea 3. Electrónica Analógica

ω	A_v	A_v/dB
$0.001\omega_c$	1	0 dB
$0.01\omega_c$	1	0 dB
$0.1\omega_c$	0.98	-0.131 dB
ω_c	0.70	-3.06 dB
$5\omega_c$	0.193	-14.24 dB
$10\omega_c$	0.098	-20.15 dB
$20\omega_c$	0.049	-26.5 dB

$$A_v = \frac{V_{sal}}{V_{ent}}$$

$$\omega = 15.707 \text{ rad/seg}$$

$$f_c = \frac{\omega_c}{2\pi}$$

①

$$\omega = 0.001 \omega_c$$

$$f_c = \frac{\omega_c}{2\pi} = \frac{15.707 \text{ rad/seg}}{2\pi}$$

$$= 2.49 \text{ Hz}$$

$$|A_v|_{\text{dB}} = 20 \log_{10}(1)$$

$$= 0 \text{ dB}$$

$$V_{ent} = 3.96 \text{ V}$$

$$V_{sal} = 3.96 \text{ V}$$

$$A_v = \frac{3.96}{3.96} = 1$$

$$\textcircled{2} \omega = 0.01 \omega_c$$

$$f_c = \frac{\omega_c}{2\pi} = \frac{157.07 \text{ rad/seg}}{2\pi} = 24.99 \text{ Hz}$$

$$V_{ent} = 3.94 \text{ V}$$

$$V_{sal} = 3.94 \text{ V}$$

$$A_v = \frac{3.94}{3.94} = 1$$

$$|A_v|_{\text{dB}} = 20 \log_{10}(1)$$

$$= 0 \text{ dB}$$

$$\textcircled{3} \omega = 0.1 \omega_c$$

$$f_c = \frac{\omega_c}{2\pi} = \frac{1577.07 \text{ rad/seg}}{2\pi} = 249.98 \text{ Hz}$$

$$V_{ent} = 4 \text{ V}$$

$$V_{sal} = 3.94 \text{ V}$$

$$A_v = \frac{3.94}{4} = 0.98$$

$$|A_v|_{\text{dB}} = 20 \log_{10}(0.98)$$

$$= -0.131 \text{ dB}$$

$$\textcircled{4} \omega_c$$

$$f_c = \frac{\omega_c}{2\pi} = \frac{15770.7 \text{ rad/seg}}{2\pi} = 2499.84 \text{ Hz}$$

$$V_{ent} = 3.97 \text{ V}$$

$$V_{sal} = 2.79 \text{ V}$$

$$A_v = \frac{2.79}{3.79} = 0.70$$

$$|A_v|_{\text{dB}} = 20 \log_{10}(0.70)$$

$$= -3.06 \text{ dB}$$

$$\textcircled{5} 5\omega_c$$

$$\omega = 5(15707 \text{ rad/seg}) = 78535 \text{ rad/seg}$$

$$f_c = \frac{\omega_c}{2\pi} = \frac{78535}{2\pi} = 12499.23 \text{ Hz}$$

$$V_{ent} = 3.98 \text{ V}$$

$$V_{sal} = 777 \text{ mV}$$

$$A_v = \frac{777 \text{ mV}}{3.98} = 0.193$$

$$|A_v|_{\text{dB}} = 20 \log_{10}(0.193) = -14.24 \text{ dB}$$

$$V_{out} = 3.99V$$

$$V_{out} = 3.92mV$$

① $10\omega_c$

$$\omega = 10(15.707 \text{ rad/sec}) = 157.070 \text{ rad/sec}$$

$$f_c = \frac{\omega_c}{2\pi} = \frac{157.070}{2\pi} = 24998.46 \text{ Hz}$$

$$A_v = \frac{332mV}{3.99V} = 0.098$$

$$14v_{dB} = 20 \log_{10}(0.098) = -20.15 \text{ dB}$$

② $10\omega_c$

$$\omega = 20(15.707 \text{ rad/sec}) = 314.140 \text{ rad/sec}$$

$$f_c = \frac{\omega_c}{2\pi} = \frac{314.140}{2\pi} = 49996.93 \text{ Hz}$$

$$V_{out} = 3.96V$$

$$V_{out} = 19.5mV$$

$$A_v = \frac{19.5mV}{3.96V} = 0.049$$

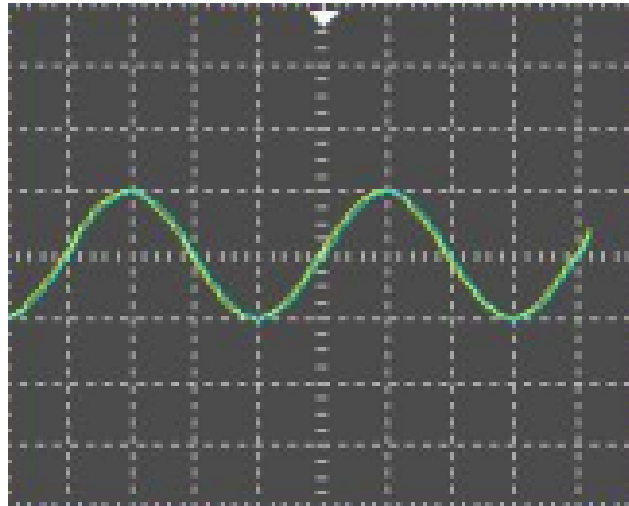
$$14v_{dB} = 20 \log_{10}(0.049) = -26.15 \text{ dB}$$

Simulaciones

1) $0.001 W_c$

$$W = 0.001 W_c$$

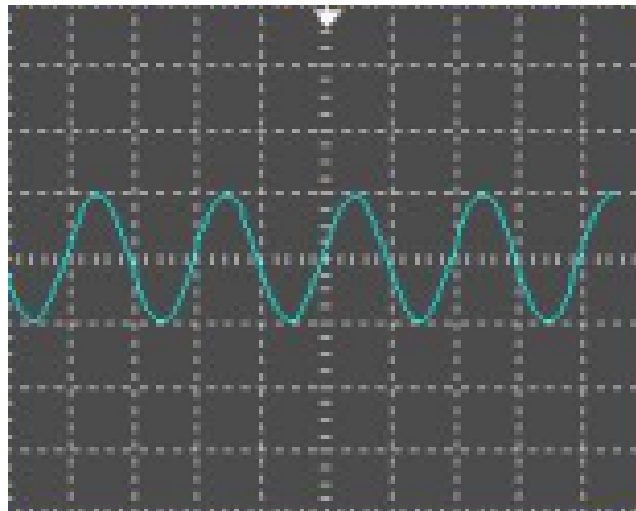
$$f_c = 249.98 \text{ Hz}$$



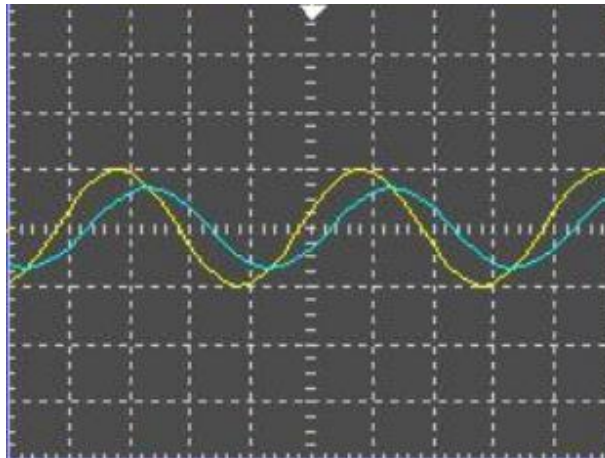
2) $0.01 W_c$

$$W = 0.01 W_c$$

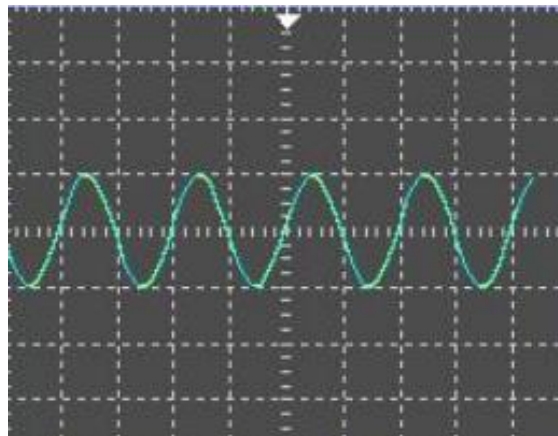
$$f_c = 2.499 \text{ Hz}$$



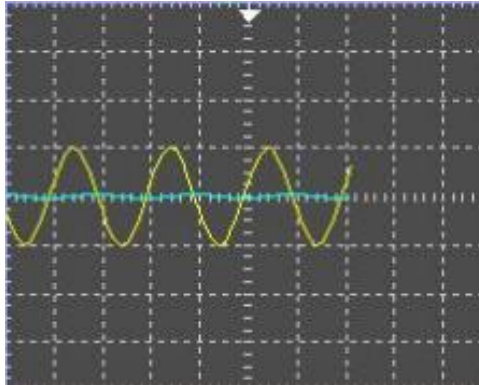
- 3) $0.1 W_c$
 $W = 0.1 W_c$
 $f_c = 2499.8 \text{ Hz}$



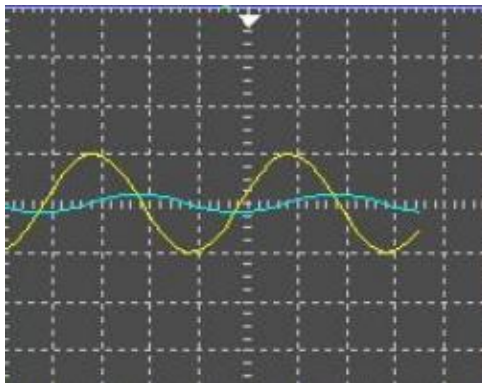
- 4) W_c
 $f_c = 24.99 \text{ Hz}$



- 5) $5 W_c$
 $W = 5 W_c$
 $f_c = 49.99 \text{ kHz}$



- 6) $10 W_c$
 $W = 10 W_c$
 $f_c = 12.49 \text{ kHz}$



- 7) $20 W_c$
 $W = 20 W_c$
 $f_c = 2499.8 \text{ Hz}$

