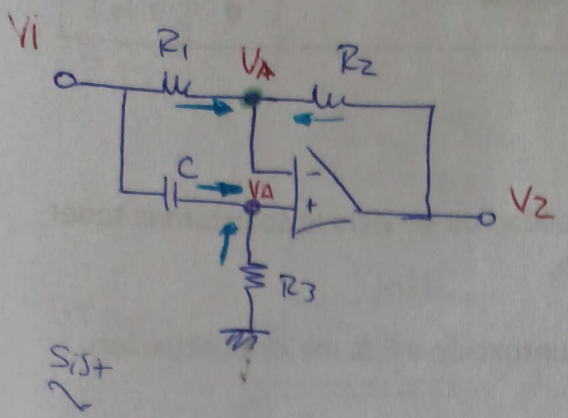
(7) Guía SISTEMÁTICO #15



- $V_A(s)\left(\frac{1}{R_1}+\frac{1}{R_2}\right)-\frac{V_i(s)}{R_1}-\frac{V_2(s)}{R_2}=0$

ecuación → $\frac{V_i(s)-V_A(s)}{R_1}+\frac{V_2(s)-V_A(s)}{R_2}=0$

$$\frac{V_i(s)}{R_1}+\frac{V_2(s)}{R_2}=V_A(s)\left(\frac{1}{R_1}+\frac{1}{R_2}\right) \quad (A)$$

Sis+

- $V_A(s)\left(sC+\frac{1}{R_3}\right)-V_i(s)\,sC=0 \Rightarrow \frac{V_A(s)}{V_i(s)}-\frac{sC}{sC+\frac{1}{R_3}}=\frac{sC}{\frac{sCR_3+1}{R_3}}$ (B)

ecuación → $(V_i(s)-V_A(s))\,sC-\frac{V_A(s)}{R_3}=0$

(A) $\frac{V_i(s)}{R_1}+\frac{V_2(s)}{R_2}=\frac{V_A(s)}{V_i(s)}\left(\frac{1}{R_1}+\frac{1}{R_2}\right)$ (B)

$$\frac{V_i(s)}{R_1}+\frac{V_2(s)}{R_2}=V_i(s)\frac{s\cdot c\cdot R_3}{s\cdot c\cdot R_3+1}\left(\frac{1}{R_1}+\frac{1}{R_2}\right)$$

$$\frac{V_2(s)}{R_2}=V_i(s)\left[\frac{s\cdot c\cdot R_3}{s\cdot c\cdot R_3+1}\left(\frac{1}{R_1}+\frac{1}{R_2}\right)-\frac{1}{R_1}\right]$$

$$T(s)=\frac{V_2(s)}{V_i(s)}=R_2\left[\frac{s\cdot c\cdot R_3}{s\cdot c\cdot R_3+1}\,\frac{R_2+R_1}{R_1\cdot R_2}-\frac{1}{R_1}\right]$$

$$T(s)=\frac{s\cdot c\cdot R_3(R_2+R_1)-(s\cdot c\cdot R_3+1)R_2}{(s\cdot c\cdot R_3+1)R_1R_2}$$

$$T(s)=\frac{sCR_3R_2+sCR_3R_1-sCR_3R_2-R_2}{sCR_3R_1+R_1}=\frac{sCR_1R_3-R_2}{sCR_1R_3+R_1}$$

$$T(s)=\frac{CR_1R_3}{CR_1R_3}\,\frac{s-R_2/CR_1R_3}{s+1/CR_3} \Rightarrow T(s)=\frac{s-R_2/CR_1R_3}{s+1/CR_3}$$

$\frac{R_2}{R_1} = 1$; $R_3 = 1k$; $C = 1\mu F$

$$T(s) = \frac{s - 1000}{s + 1000} \Rightarrow T(s)\Big|_{s=j\omega} = \frac{j\omega - 1000}{j\omega + 1000}$$

$$|T(\omega)| = \frac{\sqrt{\omega^2 + 1000^2}}{\sqrt{\omega^2 + 1000^2}} = 1 \; ; \quad \theta_{T(\omega)} = e^{j \arctg(\omega/-1000)} \Big/ e^{j \arctg(\omega/1000)}$$

$$T(\omega) = |T(\omega)| e^{j\theta(\omega)} = 1 \, e^{j(\arctg(\omega/-1000) - \arctg(\omega/1000))}$$

$$= 1 \, e^{j(-\arctg(\omega/1000) - \arctg(\omega/1000))}$$

$$= 1 \, e^{j\, -2 \arctg(\omega/1000)}$$