Puntos 4 y 5)

HOJA Nº

FECHA

Si dispusiera capacitores de 100nf debemos normalizar de tal manera que la Z_{norm} dependa de los valores a la frecuencia butterworth.

Tenemos

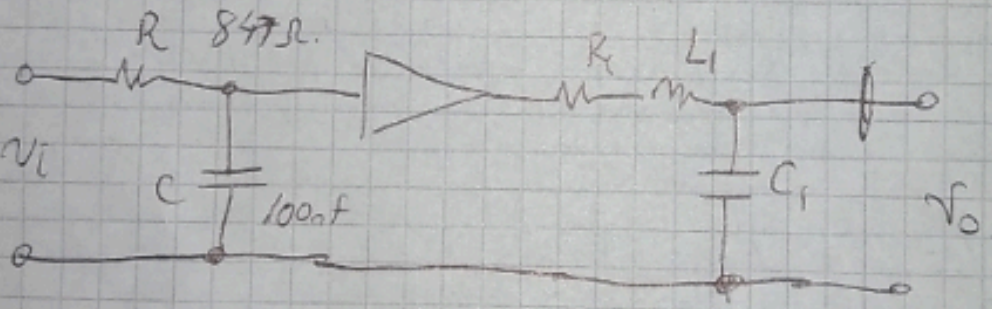
$$C_1 = 1, \quad \omega_B = 1{,}252$$

Si $f_0 = 1{,}5\,KHz \Rightarrow \quad \omega_{0B} = 2\pi f_0\, \omega_B \Rightarrow \quad \omega_{0B} = 11{,}799\,kS^{-1}$

Si $C = 10^{-7}\,F \Rightarrow \quad Z_n = \dfrac{1}{\omega C} \Rightarrow \quad Z_n = \dfrac{1}{11{,}798.10^3[s^{-1}]\,10^{-7}[F]}$

$$Z_n = 847{,}5\,\Omega$$

Luego normalizamos los etapas



$$\frac{1}{RC} = \omega \Rightarrow \quad C = 1 \Rightarrow \quad R = \frac{1}{\omega_B} \Rightarrow \quad R = 0{,}798$$

$\boxed{C = 10^{-7}} \Rightarrow$ para $\omega_c = 1500.2\pi \Rightarrow \quad Z_n = \dfrac{1}{\omega_0 C} \Rightarrow Z_n = 1061$

$R = 0{,}798 \cdot 1061 \Rightarrow \boxed{R = 846{,}678\,\Omega}$

Luego a

$C_0 = 1$ y $C_1 = 10^{-7} \Rightarrow$ si $\dfrac{C_n}{C} = \dfrac{1}{Z_n \omega_B} \Rightarrow \left(\dfrac{C_0}{C}\omega_B\right)^{-1} = Z_n$

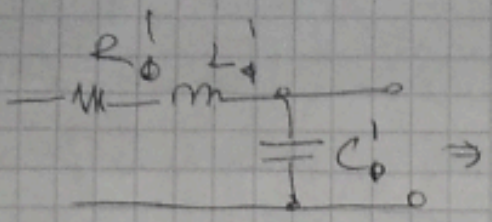
$Z_n = 1061\,\Omega \Rightarrow$

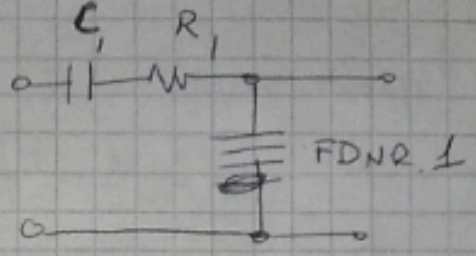
$$L_1 = (C\omega_0^2)^{-1} \Rightarrow L_1 = 0{,}637 \cdot \Rightarrow L_1 = \frac{0{,}637}{2\pi} \cdot \frac{Z_0}{f_0}$$

$$R_1 = \frac{\omega_0 \cdot L_1}{Q} Z_n \Rightarrow \boxed{R_1 = 0{,}798 \cdot Z_n}$$

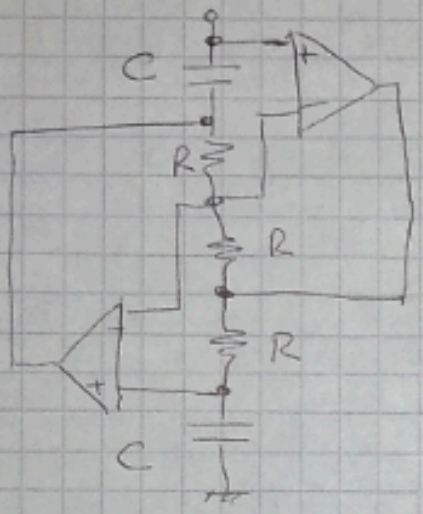
NOTA

Para cambiar a FDNR.





Para el FDNR 1:



donde $\Rightarrow$ $C = \frac{1}{\Omega_z \Omega_\omega}$

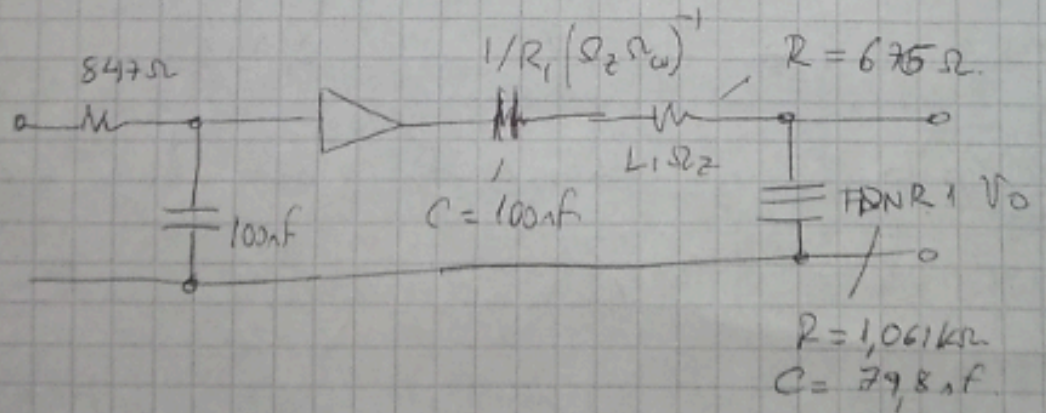
$R = \Omega_z$

con $\Omega_z = 1{,}061\,k\Omega$

$\Omega_\omega = 1$

luego

$$C_1 = \frac{1/R_1}{\Omega_z \Omega_\omega} \qquad R_1 = L_1 \Omega_z$$



NOTA