$$T_{Bp}(\$) = \frac{1}{Q} \cdot \frac{0{,}715 \cdot \$^3}{Q^2(\$^6 + 3\$^4 + 3\$^2 + 1) + Q1{,}252 \cdot (\$^4 + 2\$^2 + 1) \cdot \$ + 1{,}531 \cdot (\$^2 + 1) \cdot \$^2 + \frac{0{,}715}{Q} \cdot \$^3}$$

$$T_{Bp}(\$) = \frac{1}{Q} \cdot \frac{0{,}715\ \$^3}{Q^2(\$^6 + 3\$^4 + 3\$^2 + 1) + Q1{,}252\,(\$^5 + 2\$^3 + \$) + 1{,}531(\$^4 + \$^2) + \frac{0{,}715\ \$^3}{Q}}$$

$$T_{Bp}(\$) = \frac{0{,}715/Q^3 \cdot \$^3}{\$^6 + \frac{1{,}252}{Q} \cdot \$^5 + \left(3 + \frac{1{,}531}{Q^2}\right) \cdot \$^4 + \left(\frac{1{,}504}{Q} + \frac{0{,}715}{Q^3}\right) \cdot \$^3 + \left(3 + \frac{1{,}531}{Q^2}\right) \$^2 + \frac{1{,}252}{Q}\$ + 1}$$

- Implementación mediante redes prototipo:

Expando $T_{LP}(\$)$

$$T_{LP}(\$) = 0{,}715 \cdot \frac{1}{\$ + 0{,}1627} \cdot \frac{1}{\$^2 + 0{,}1624\$ + 1{,}139}$$

$$T_{LP}(\$) = 0{,}715 \cdot \frac{1}{0{,}1627} \cdot \frac{0{,}1627}{\$ + 0{,}1627} \cdot \frac{1}{1{,}139} \cdot \frac{1{,}139}{\$^2 + 0{,}1624\$ + 1{,}139}$$

$$T_{LP}(\$) = \frac{0{,}1627}{\$ + 0{,}1627} \cdot \frac{1{,}139}{\$^2 + 0{,}1624\$ + 1{,}139}$$

Convierto cada término con la transformación

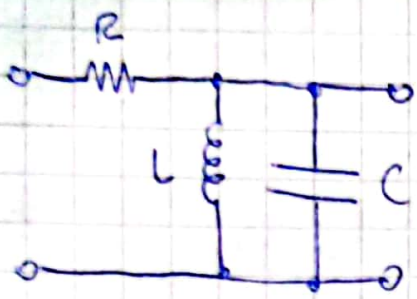
$$T_{BP}(\$) = T_{LP}\left(Q \cdot \frac{\$^2+1}{\$}\right) = \frac{0{,}1627}{Q\frac{(\$^2+1)}{\$} + 0{,}1627} \cdot \frac{1{,}139}{Q^2 \cdot \frac{(\$^2+1)^2}{\$^2} + 0{,}1624 \cdot Q\frac{(\$^2+1)}{\$} + 1{,}139}$$

$$T_{BP}(\$) = \frac{0{,}1627\,\$}{Q\,\$^2 + Q + 0{,}1627\,\$} \cdot \frac{1{,}139\,\$^2}{Q^2 \cdot (\$^4 + 2\$^2 + 1) + 0{,}1624 \cdot Q(\$^2+1)\cdot\$ + 1{,}139\,\$^2}$$

$$T_{BP}(\$) = \frac{\$\,0{,}1622}{\$^2 + \$\,0{,}1253 + 1} \cdot \frac{\$\,0{,}108}{\$^2 + \$\,0{,}06902 + 1{,}226} \cdot \frac{\$\,0{,}08304}{\$^2 + \$\,0{,}05627 + 0{,}8154}$$

$$T_{BP}(\$) = \frac{0{,}1622}{0{,}1253} \cdot \frac{\$\,0{,}1253}{\$^2 + \$\,0{,}1253 + 1^2} \cdot \frac{0{,}108}{0{,}06902} \cdot \frac{\$\,0{,}069}{\$^2 + \$\,0{,}069 + 1{,}107^2} \cdot \frac{0{,}08304}{0{,}0562} \cdot \frac{\$\,0{,}056}{\$^2 + \$\,0{,}056 + 0{,}902^2}$$

$$T_{BP}(\$) = 1{,}178 \cdot \frac{\$\,0{,}1253}{\$^2 + \$\,0{,}1253 + 1^2} \cdot \frac{\$\,0{,}069}{\$^2 + \$\,0{,}069 + 1{,}107^2} \cdot \frac{\$\,0{,}056}{\$^2 + \$\,0{,}056 + 0{,}902^2}$$



$$T(s) = \frac{G}{G + \frac{1}{sL} + sC} = \frac{sGL}{sLG + 1 + s^2LC}$$

$$T(s) = \frac{s\frac{1}{RC}}{s^2 + s\frac{1}{RC} + \frac{1}{LC}}$$

$\Omega w = w_0$

$\Omega z = R \rightarrow R' = 1$; L', C'

$R = 1$

$w_0 = 1$

$$\frac{w_0}{Q} = \frac{1}{RC} = \frac{1}{C} \rightarrow C = \frac{Q}{w_0} = Q$$

$$w_0^2 = \frac{1}{LC} \rightarrow 1 = \frac{1}{LC} \Rightarrow L = \frac{1}{C} = \frac{1}{Q}$$

Con $w_0 \neq 1$: $C = \frac{Q}{w_0}$; $L = \frac{1}{Qw_0}$

$T_1(s)$: $w_0 = 1$

$$\frac{w_0}{Q} = 0{,}1253 \rightarrow Q = 7{,}98$$

$C_1 = 7{,}98$; $L_1 = 0{,}1253$

$T_2(s)$: $w_0 = 1{,}107$

$$\frac{w_0}{Q} = 0{,}069 \rightarrow Q = 16{,}04$$

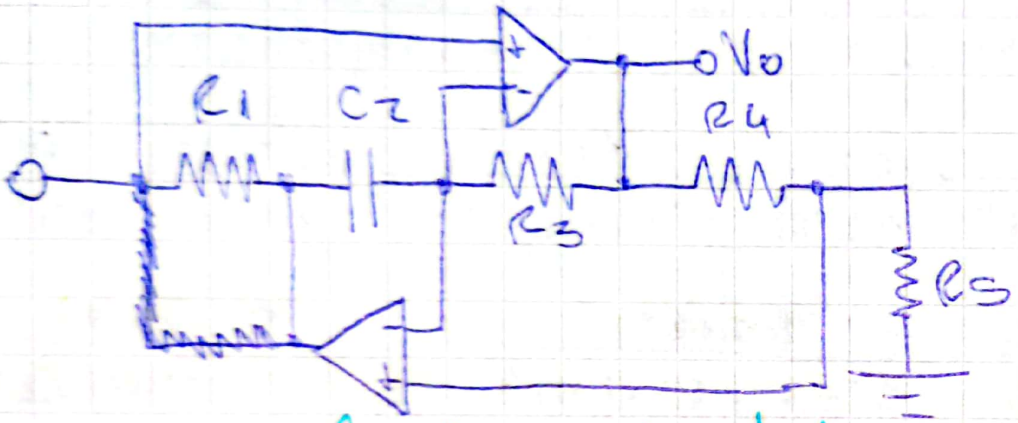
$C_2 = 14{,}49$; $L_2 = 0{,}056$

$T_3(s)$: $w_0 = 0{,}902$

$$\frac{w_0}{Q} = 0{,}056 \rightarrow Q = 16{,}107$$

$C_3 = 17{,}87$; $L_3 = 0{,}068$

- Activación red pas: V3:



$$K = \frac{R_4 + R_5}{R_5} = 1 + \frac{R_4}{R_5}$$

$$L_{eq} = C_2 R_1 R_3 \frac{R_5}{R_4}$$

$C_2 = 1$ $R_1 = R_5 = 1$

Por el Divisor de entrada

Mal K

T1: $K = \frac{11,78}{3} = 7,85$; $R_4 = K - 1 = 10,78$; $R_3 = \frac{L \cdot R_4}{C_2 R_1 R_5} = 1,35$

T2: $K = 7,85$; $R_4 = 10,78$; $L = 0,056$ → $R_3 = 0,603$

T3: $K = 7,85$; $R_4 = 10,78$; $L = 0,068$ → $R_3 = 0,735$

NOTA

- Continuación Tarea Semanal 4:

$K = \sqrt[3]{11,73} = 2,275$ → Separo la ganancia en las 3 etapas

Atenúo 2 veces en la entrada → $K = 2,275 \cdot 2 = 4,55$

T1: $R_4 = K - 1 = 3,55$; $R_3 = \frac{L \cdot R_4}{C_2 \cdot R_1 R_5} = 0,449$

$L_1 = 0,1253$

T2: $R_4 = K - 1 = 3,55$; $R_3 = 0,1988$

$L_2 = 0,056$

T3: $R_4 = K - 1 = 3,55$; $R_3 = 0,2414$

$L_3 = 0,068$