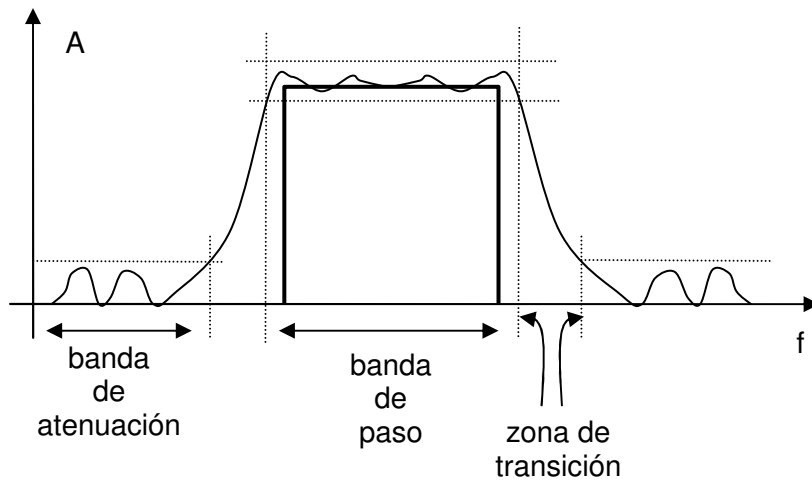


## FILTROS

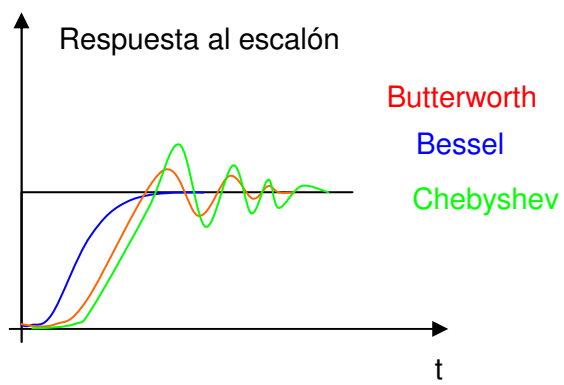
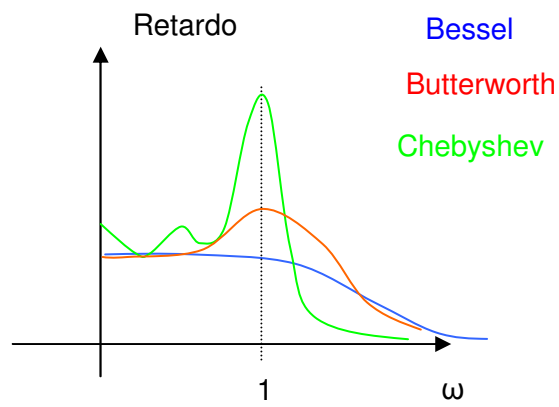
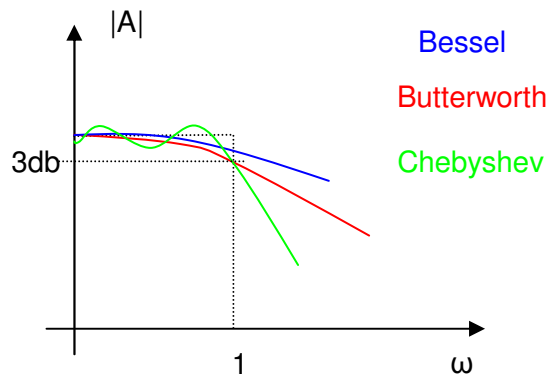


$$A(j\omega) = \frac{N(j\omega)}{D(j\omega)}$$

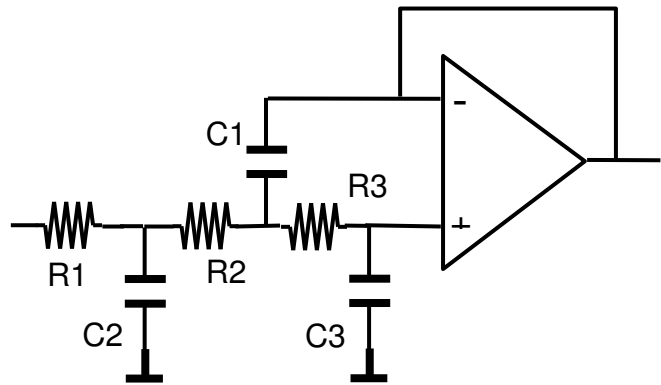
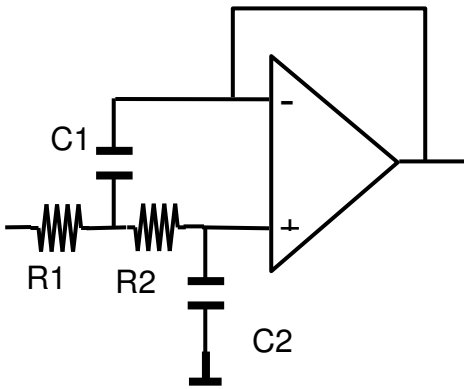
*MÓDULO:*  $A(\omega)$

*FASE:*  $\angle A(j\omega)$

*RETARDO:*  $\frac{\partial \angle A(j\omega)}{\partial \omega}$



FILTROS  
ESTRUCTURAS PROTOTIPO:



$$R_p = 1$$

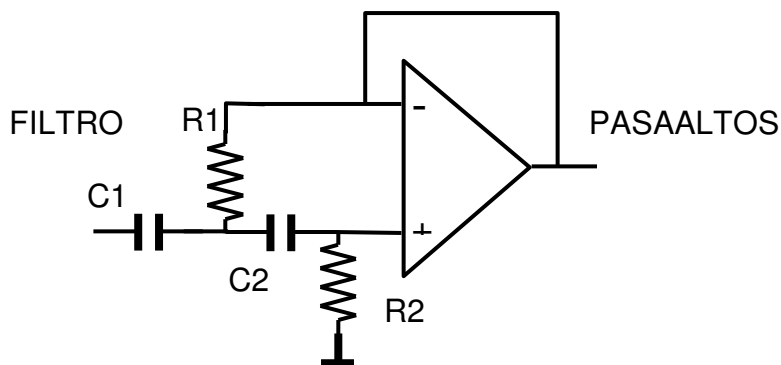
$$\omega_p = 1$$

$$FSF = \frac{2\pi f_c}{\omega_p}$$

$$\frac{\omega_c}{\omega_p} = \frac{R_p C_p}{R_f C_f} \Rightarrow FSF = \frac{1}{Z} \cdot \frac{C_p}{C_f}$$

$$Z = \frac{R_f}{R_p}$$

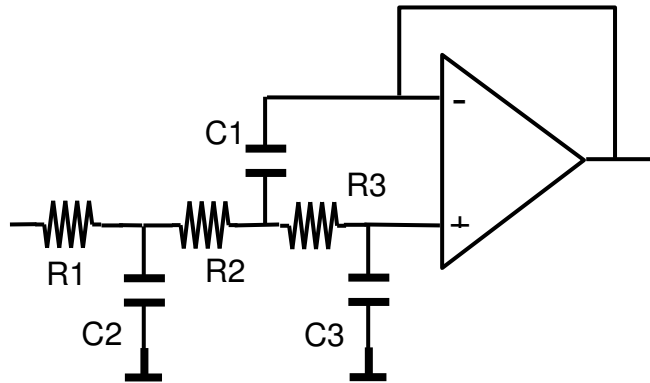
$$C_f = C_p \cdot \frac{1}{FSF \cdot Z}$$



$$R_i = \frac{1}{C_i} \quad [\Omega]$$

Ejemplo:

Filtro pasabajos orden 3.  $f_c = 10$  Hz



faradios	Butterworth	Chebyshev	Bessel
C1	3,546	11,23	1,423
C2	1,392	2,25	0,988
C3	0,2024	0,0895	0,2538

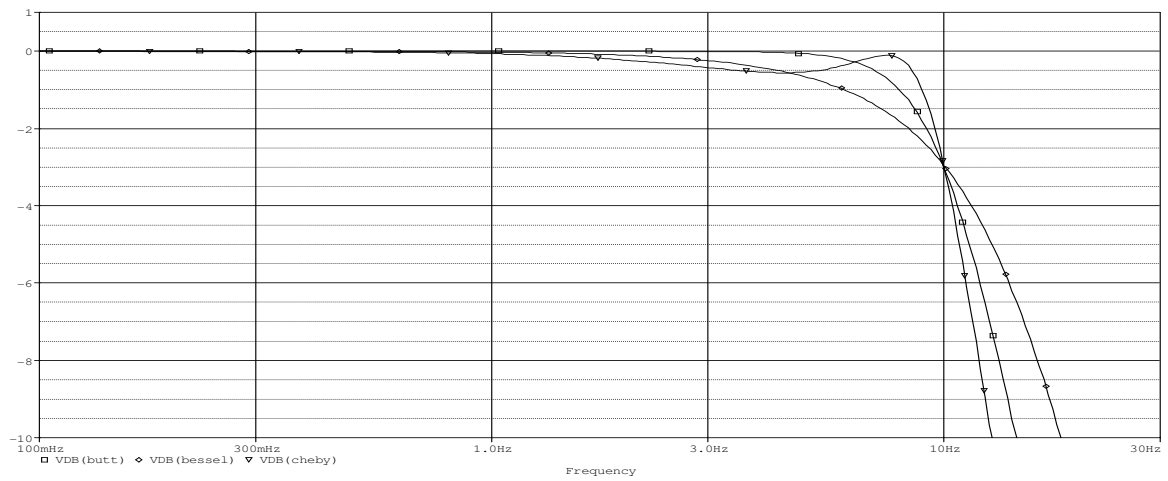
$$FSF = \frac{2 \cdot \pi \cdot 10}{1} = 62,83$$

$$Z = \frac{R'}{1[\Omega]} = 100K$$

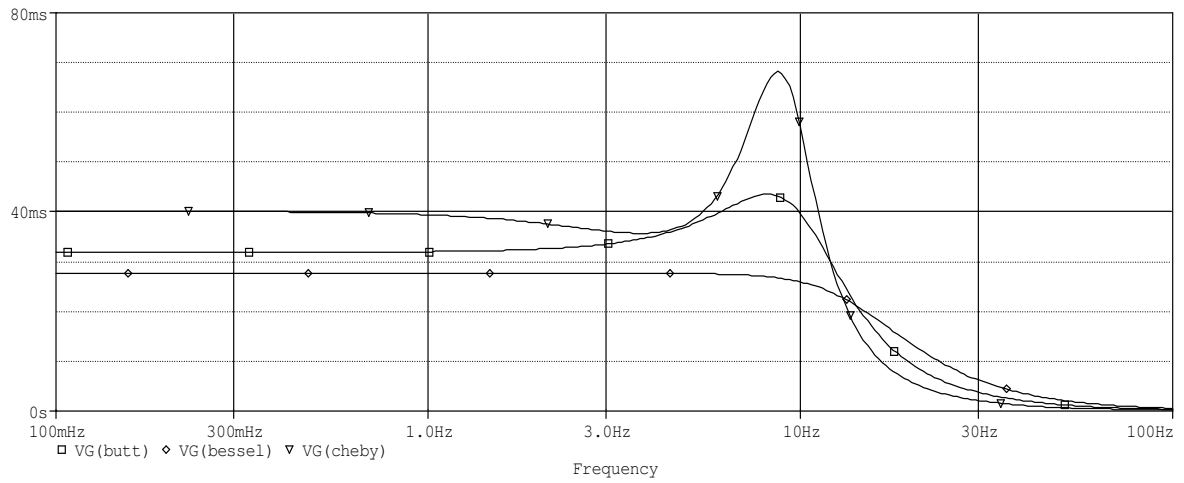
$$\Rightarrow C' = \frac{C}{62,83 \cdot 10^5}$$

uf	Butterworth	Chebyshev	Bessel
C1	0,5643	1,787	0,226
C2	0,22	0,358	0,1572
C3	0,032	0,014	0,04

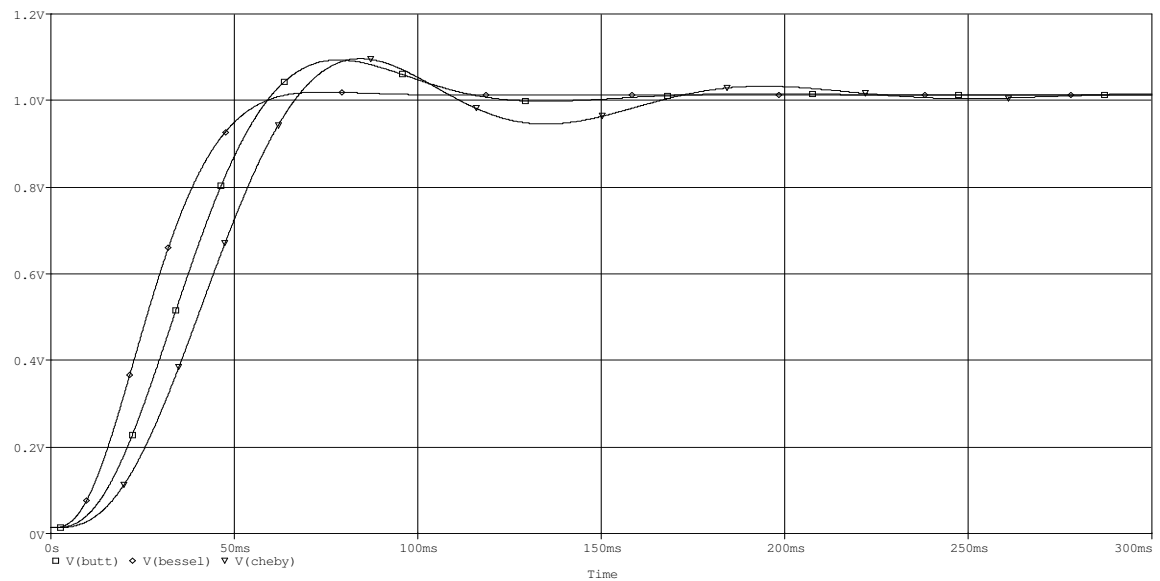
## GANANCIA:



## RETARDO:

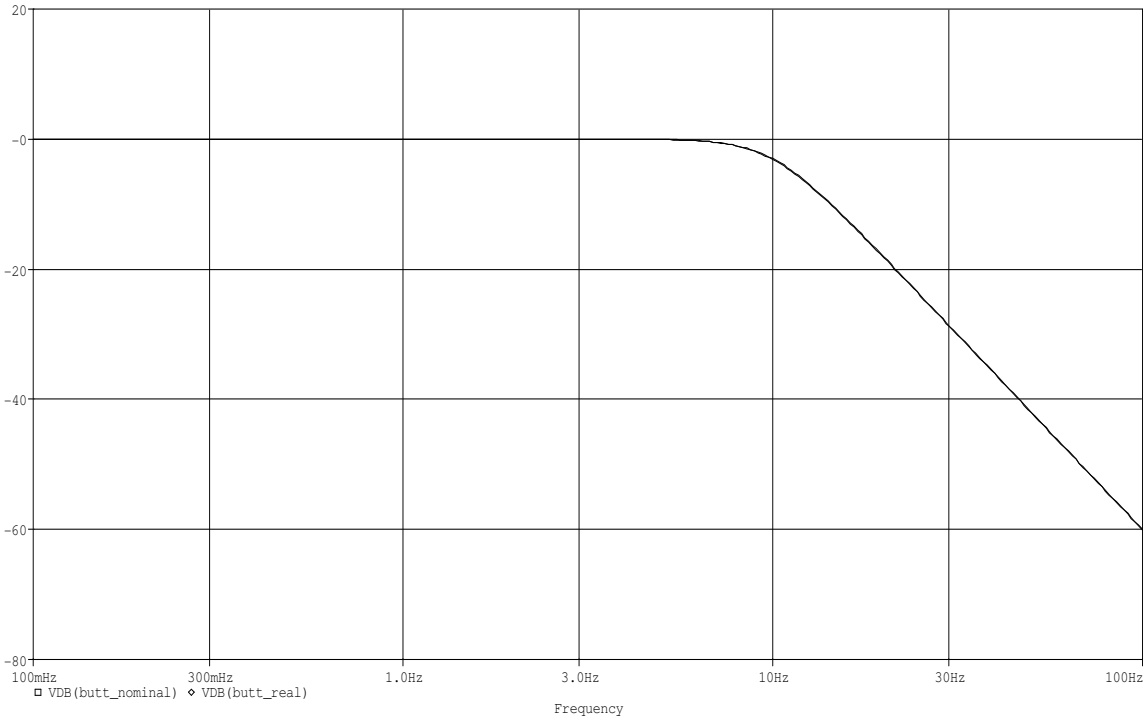


## RESPUESTA AL ESCALÓN:

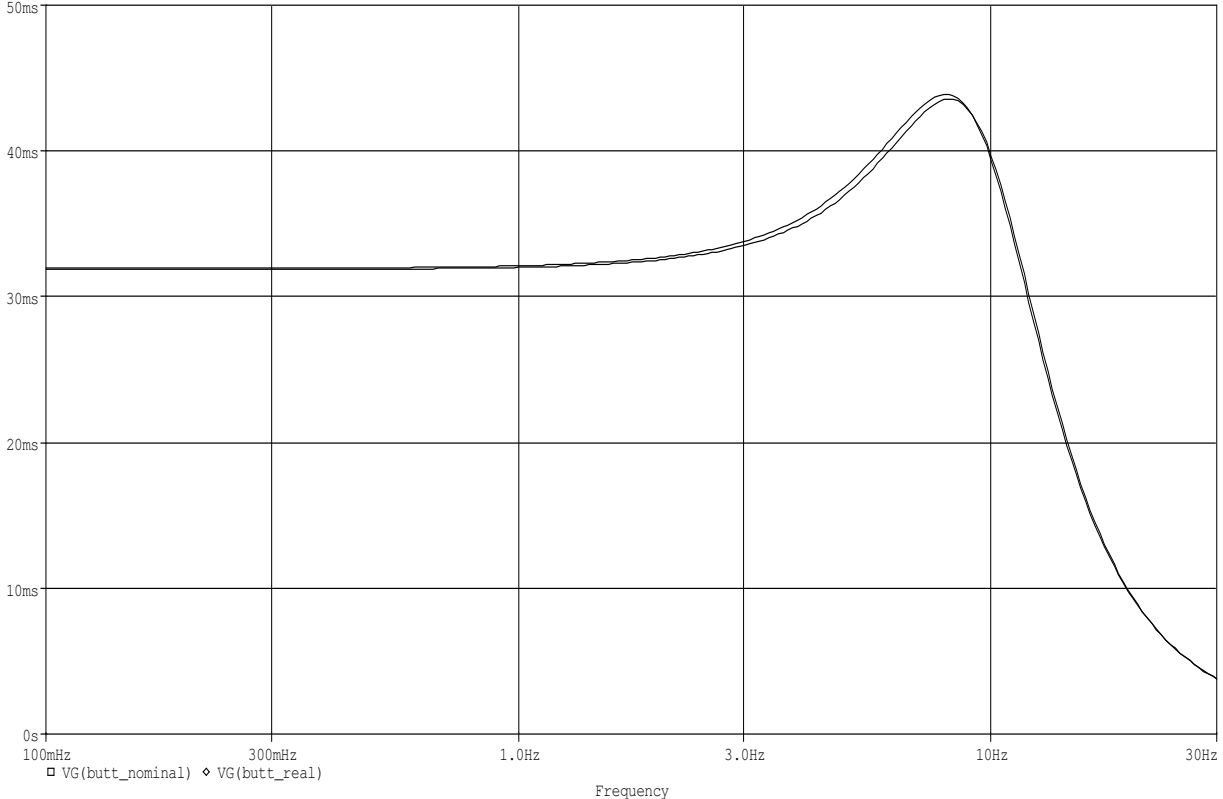


# FILTRO BUTTERWORTH

## GANANCIA



## RETARDO:



# DISPERSIÓN DE LOS COMPONENTES:

