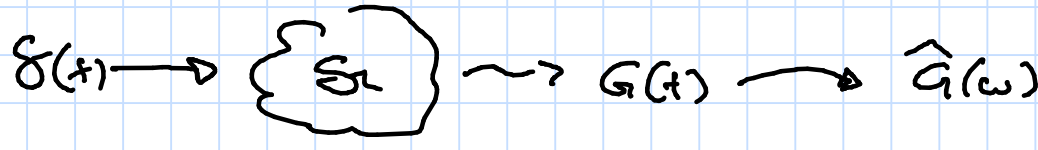


$$r(t) = \int G(t-t') f(t') dt' = G * f$$

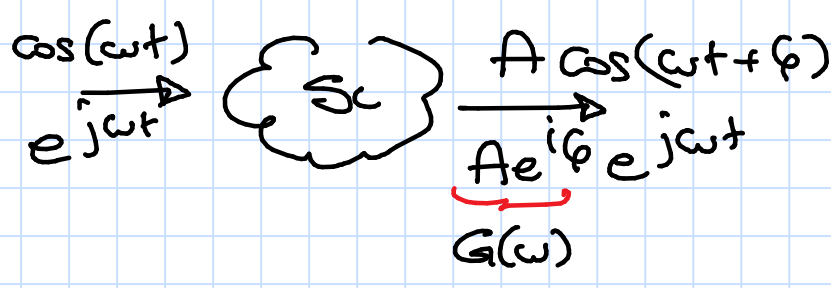
funzione di risposta. (o di trasferimento)

Fourier transform

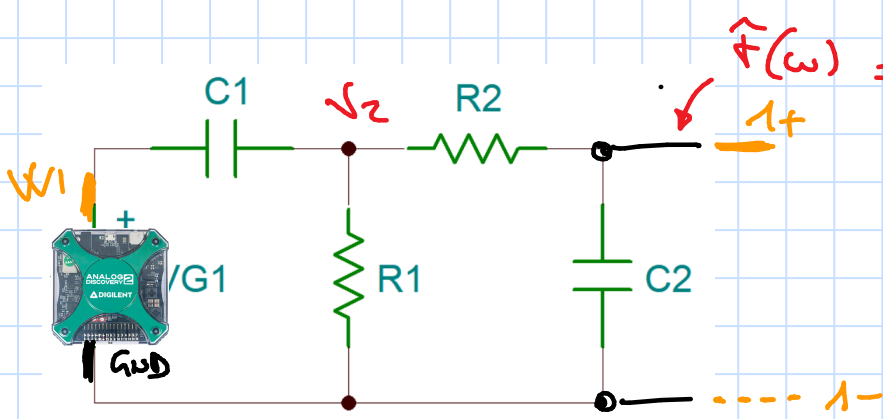
$$\hat{r}(\omega) = \hat{G}(\omega) \cdot \hat{f}(\omega)$$

① Come misurare  $\hat{G}(\omega)$ ?IR = IMPULSIVE RESPONSE  $f(t) = \delta(t)$ 

CW = CONTINUOUS WAVE



② CASO SPECIFICO SINDRATO: Reti elettriche passive



$$\hat{G}(\omega) = \frac{P(j\omega)}{Q(j\omega)}$$

$$\hat{f}(\omega) = \hat{u}_i(\omega)$$

$$\hat{v}_{out} = \frac{1}{R_2 + \frac{1}{j\omega C_2}} \hat{v}_2 = \frac{\hat{v}_2}{1 + j\omega R_2 C_2}$$

$\tau_2$

ESEMPIO

$$\hat{v}_{out} = \frac{j\omega \tau_1 \cdot \hat{u}_i(\omega)}{(1 + j\omega \tau_1)(1 + j\omega \tau_2) + j\omega R_1 C_2} = \frac{P(j\omega)}{Q(j\omega)}$$

$$\left[ \begin{matrix} \text{MATRICE} \end{matrix} \right] \xrightarrow{\text{CONVERTI}} \text{FOUR+DMM}$$

eq. nodi conosciute  $\pm 1$   
eq. maglie  $j\omega L$   $\frac{1}{j\omega C}$

ROUTING A COEFFICIENTI REALI...

③ Come COMBINARE UNA  $\hat{G}(\omega)$ 

Bode plot.

$$G(\omega) = \frac{A(\omega)B(\omega)}{C(\omega)}$$

$$\log[G(\omega)] = \log[A(\omega)] + \log B - \log C$$

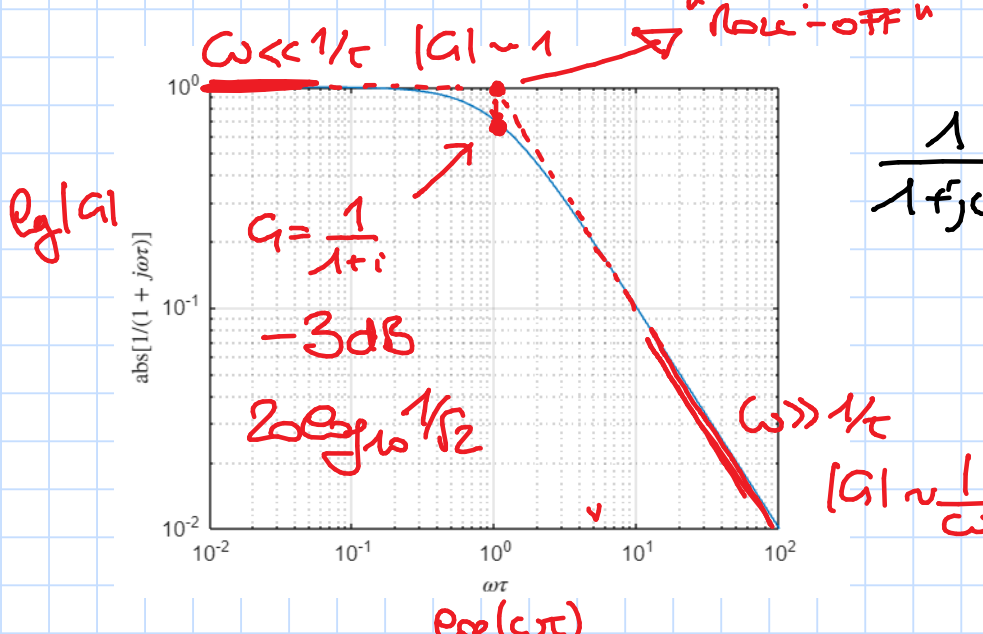
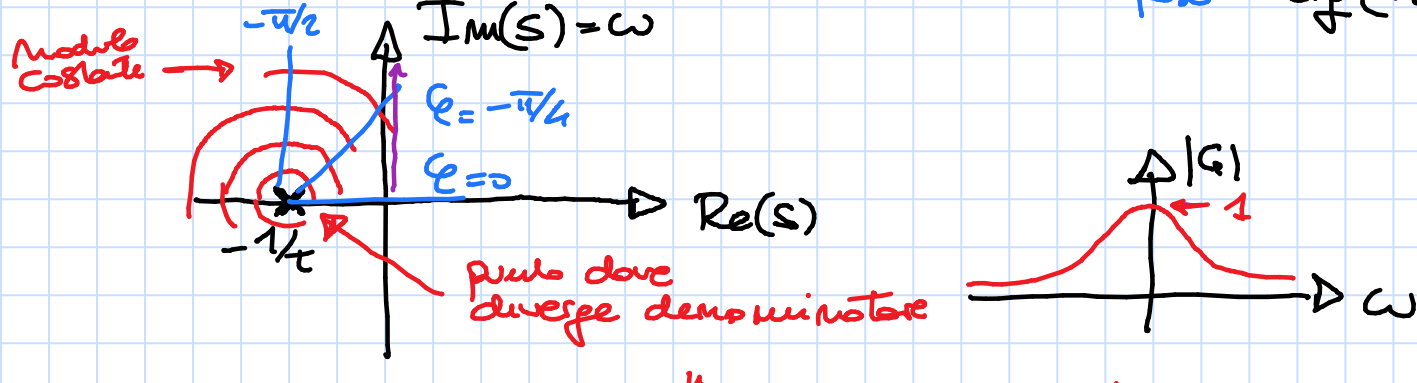
vs  $\log(\omega)$

CAVITÀ PERCHÉ È LA SOMMA DI LACI TENUTI BEN NOTI...

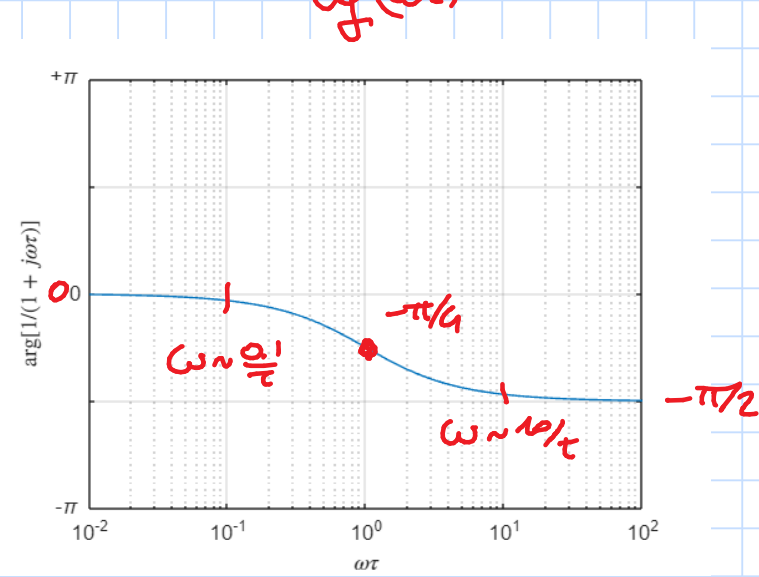
①  $\frac{1}{1+j\omega\tau}$  ← RADICE REALE  
S ← del principio della TRASFORMATA DI LAPLACE

$$|mod|_0 = |1/(1+j\omega\tau)|$$

$$f_{0\%} = \sigma_p(1/(1+j\omega\tau))$$



$$20 \log_{10} |\frac{\hat{v}_{out}}{\hat{v}_{in}}|$$

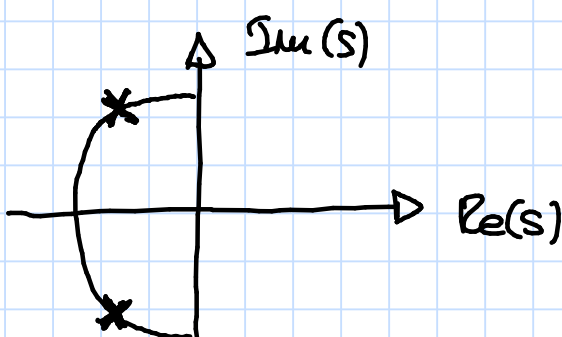


$\omega = 2\pi f$

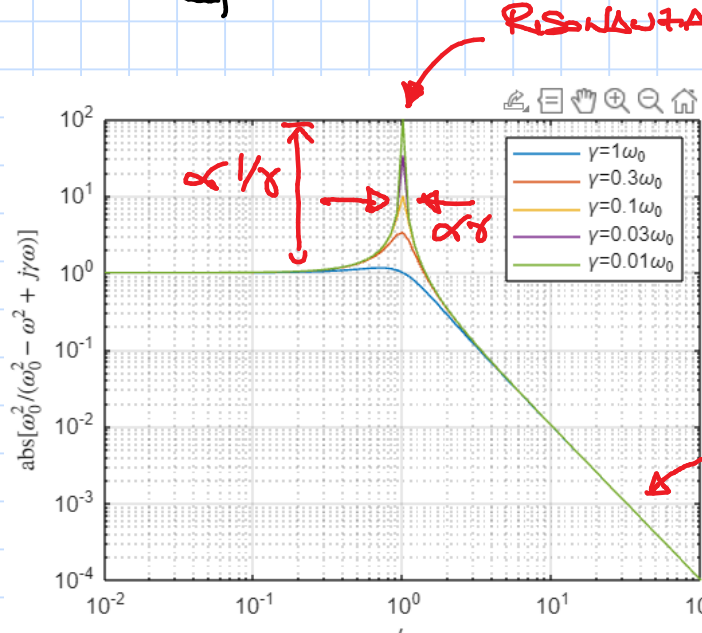
$\omega = 2\pi f$

$\omega = 2\pi f$

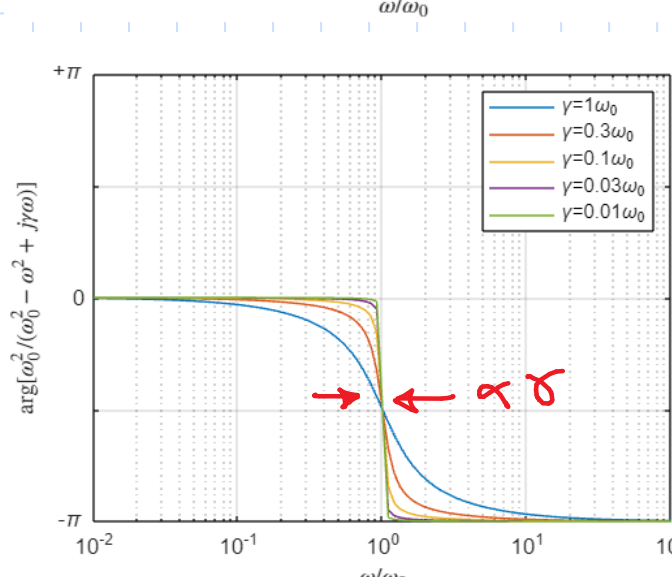
②  $\frac{1}{\omega_0^2 - \omega^2 + j\omega\gamma}$  ← RADICE COMPLESSO CONIUGATE



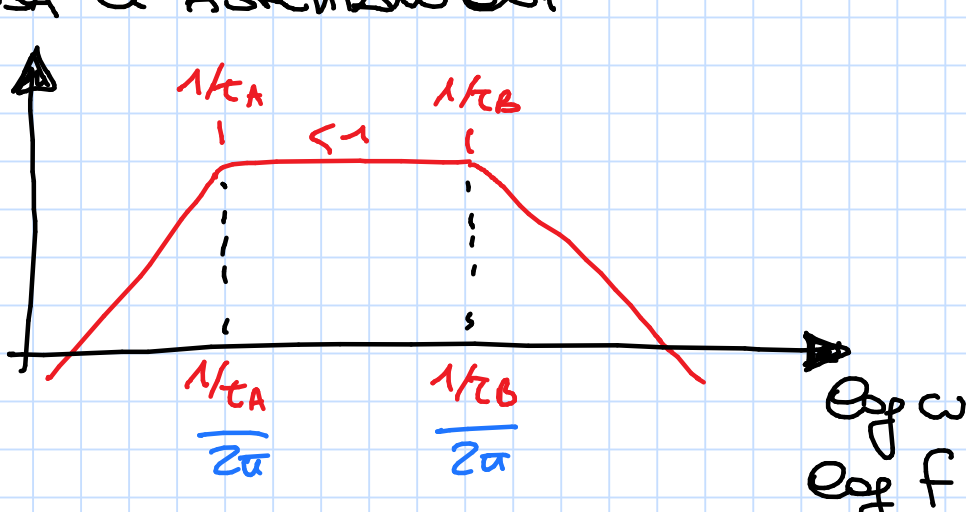
$G(f) = e^{-\gamma/2} \sin(\omega t + \phi)$



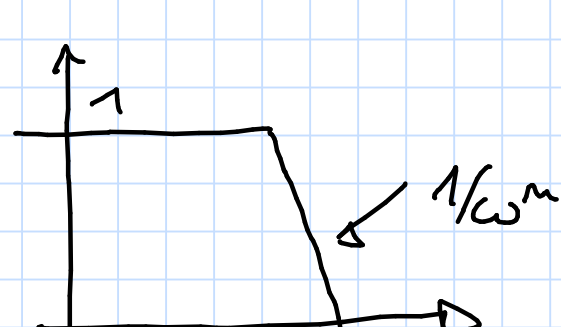
$$Q_{factor} = \frac{\omega_0}{\gamma}$$



COSA È ASPETTANDO?



④ ALTRI DETTAGLI POSSIBILI REALIZZAZIONE FILTRI AD ALTA



BUTTERWORTH FILTER

