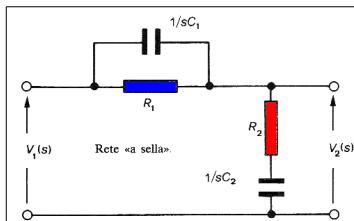


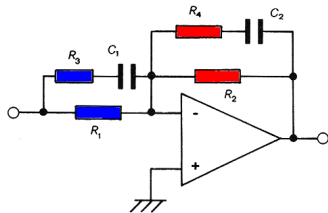
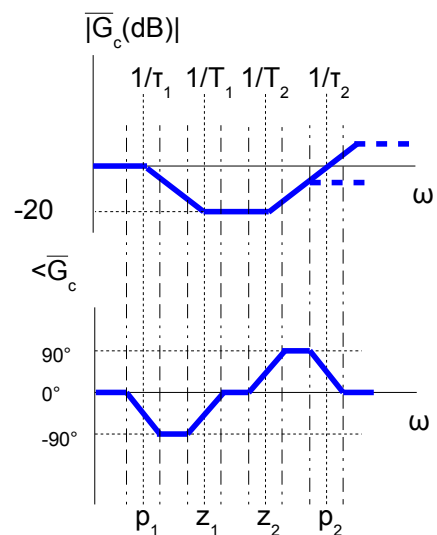
Circuito	Valori	G(s)
Rete anticipatrice.	$G(s) = K \frac{1+Ts}{1+\tau s}$ $K = R_2/(R_1+R_2)$ $T = R_2 C \quad z = 1/T$ $\tau = R_1 R_2/(R_1+R_2) C \quad p = 1/\tau$ $T > \tau \quad z < p$	
Rete anticipatrice attiva	$G(s) = K \frac{1+Ts}{1+\tau s}$ $K = -R_2/R_1$ $T = (R_1+R_2)C \quad z = 1/T$ $\tau = R_2 C \quad p = 1/\tau$ $T > \tau \quad z < p$	
Rete ritardatrice.	$G(s) = K \frac{1+Ts}{1+\tau s}$ $K = 1$ $T = R_2 C \quad z = 1/T$ $\tau = (R_1+R_2)C \quad p = 1/\tau$ $T < \tau \quad z > p$	
Rete ritardatrice attiva	$G(s) = K \frac{1+Ts}{1+\tau s}$ $K = -R_2/R_1$ $T = R_2 C \quad z = 1/T$ $\tau = (R_2+R_3)C \quad p = 1/\tau$ $T < \tau \quad z > p$	



Se
 $R_1 \gg R_2$ e $C_2 \gg C_1$

$$G(s) \approx K \frac{(1+T_1 s)(1+T_2 s)}{(1+\tau_1 s)(1+\tau_2 s)}$$

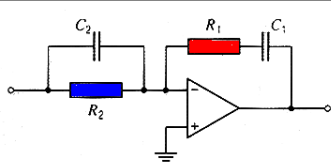
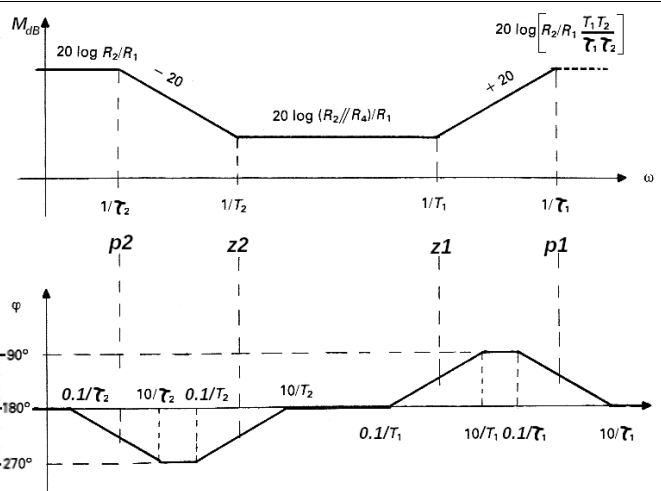
$K = 1$
 $T_1 = R_1 C_1$ $z_1 = 1/T_1$
 $T_2 = R_2 C_2$ $z_2 = 1/T_2$
 $\tau_1 = R_2 C_1$ $p_1 = 1/\tau_1$
 $\tau_2 = R_1 C_2$ $p_2 = 1/\tau_2$
 $\tau_1 > T_1 > T_2 > \tau_2$ $p_1 < z_1 < z_2 < p_2$



Rete a "sella" attiva

$(1+T_1 s)(1+T_2 s)$
 $G(s) = K \frac{(1+T_1 s)(1+T_2 s)}{(1+\tau_1 s)(1+\tau_2 s)}$

C_1 = Da impostare per prima
 $K = -R_4/R_3$
 $T_1 = C_1 R_2$ $z_1 = 1/T_1$
 $T_2 = C_1 (R_1 + R_3)$ $z_2 = 1/T_2$
 $\tau_1 = C_2 R_1$ $p_1 = 1/\tau_1$
 $\tau_2 = C_2 (R_2 + R_4)$ $p_2 = 1/\tau_2$
 $\tau_1 < T_1 < T_2 < \tau_2$ $p_1 > z_1 > z_2 > p_2$
 Nota: Ricavare, nell'ordine, R_4 , R_3 , R_2 .
 Utilizzare le due equazioni rimaste per calcolare C_2 e R_4 .



PID

$G(s) = K_p + K_I/s + K_D s$
 $K_p = \frac{R_2 C_2 + R_1 C_1}{R_2 C_1}$
 $K_I = \frac{1}{R_2 C_1}$
 $K_D = R_1 C_2$

Se $K_p > 2(K_D K_I)^{0.5}$
 gli zeri sono reali e valgono:
 $Z_{1,2} = [-K_p \pm (K_p^2 - 4K_D K_I)^{0.5}]/(2K_D)$
 $\omega_n = (K_I/K_D)^{0.5}$
 $\zeta = 0.5K_p[1/(K_D K_I)]^{0.5}$
 Dati, Z_1 , Z_2 e K_p :
 $K_D = -K_p/(Z_1 + Z_2)$
 $K_I = [K_p^2 - K_D^2 (Z_1 - Z_2)^2]/(4K_D)$

