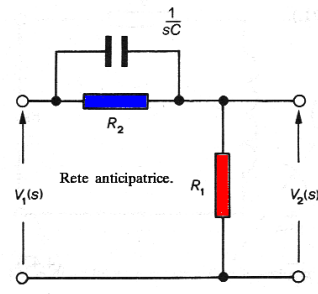
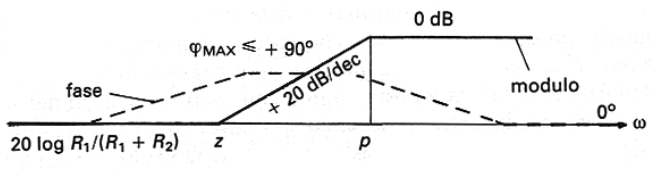
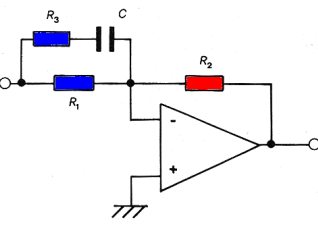
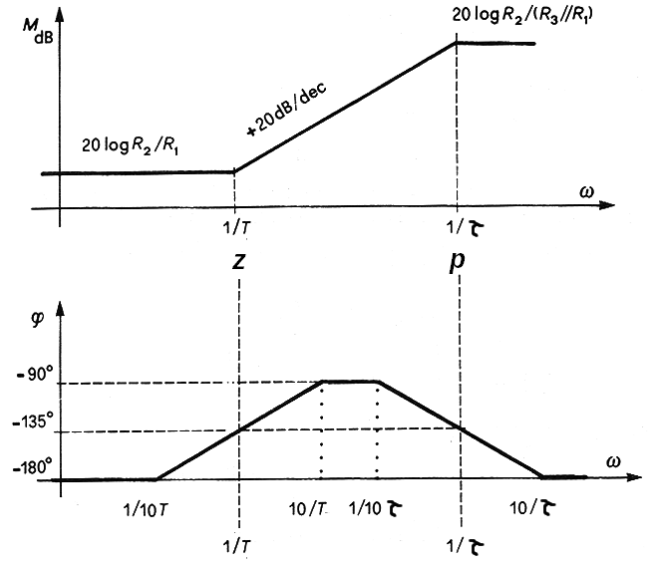
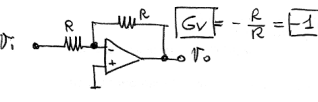
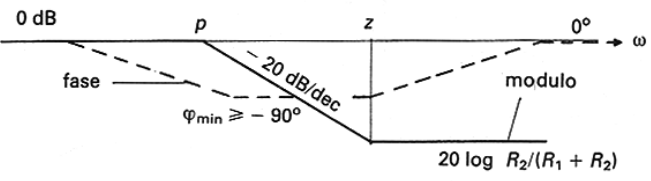
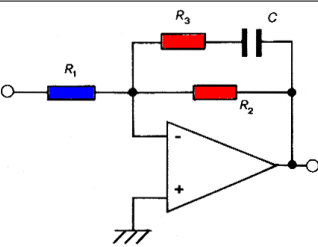
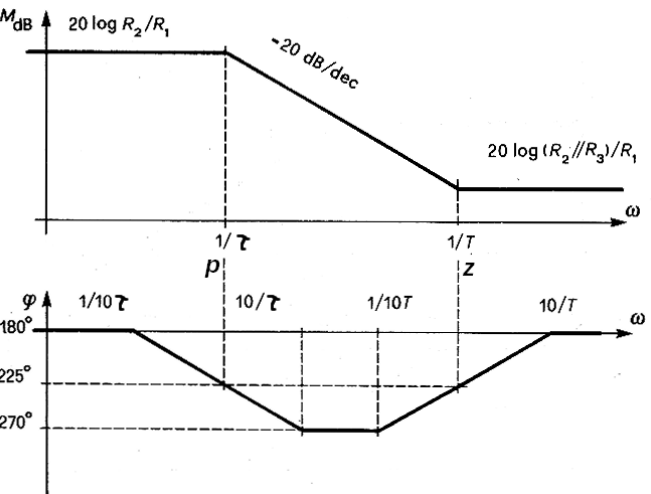
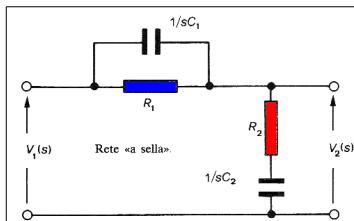


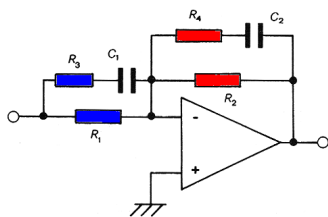
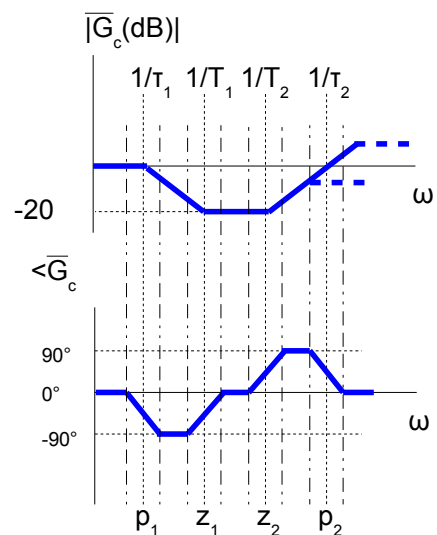
Circuito	Valori	G(s)
 Rete anticipatrice.	$G(s) = K \frac{1+Ts}{1+\tau s}$ $K = R_1/(R_1+R_2) \quad z = 1/T$ $T = R_2 C \quad p = 1/\tau$ $\tau = R_1 R_2/(R_1+R_2) C \quad p = 1/\tau$ $T > \tau \quad z < p$	
 Rete anticipatrice attiva	$G(s) = K \frac{1+Ts}{1+\tau s}$ $K = -R_2/R_1 \quad z = 1/T$ $T = (R_1+R_2)C \quad p = 1/\tau$ $\tau = R_2 C \quad p = 1/\tau$ $T > \tau \quad z < p$	
Per ottenere la corretta funzione G(s) è necessario porre in cascata un invertitore di tensione.  $G_V = -\frac{R}{R} = -1$	$G(s) = K \frac{1+Ts}{1+\tau s}$ $K = 1 \quad z = 1/T$ $T = R_2 C \quad p = 1/\tau$ $\tau = (R_1+R_2)C \quad p = 1/\tau$ $T < \tau \quad z > p$	
 Rete ritardatrice attiva	$G(s) = K \frac{1+Ts}{1+\tau s}$ $K = -R_2/R_1 \quad z = 1/T$ $T = R_2 C \quad p = 1/\tau$ $\tau = (R_2+R_3)C \quad p = 1/\tau$ $T < \tau \quad z > p$	



Se
 $R_1 \gg R_2 \text{ e } C_2 \gg C_1$

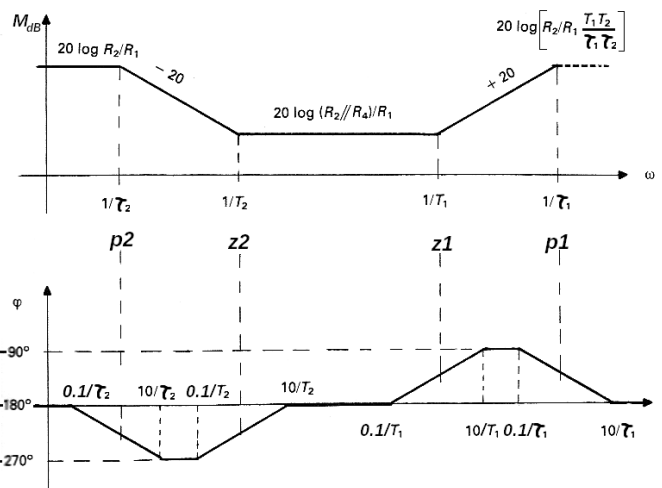
$$G(s) \approx K \frac{(1+T_1 s)(1+T_2 s)}{(1+\tau_1 s)(1+\tau_2 s)}$$

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



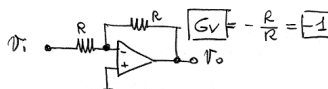
$(1+T_1 s)(1+T_2 s)$
 $G(s) = K \frac{(1+T_1 s)(1+T_2 s)}{(1+\tau_1 s)(1+\tau_2 s)}$

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

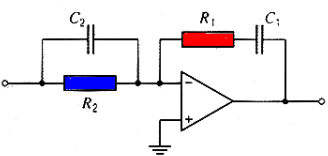


Rete a "sella" attiva

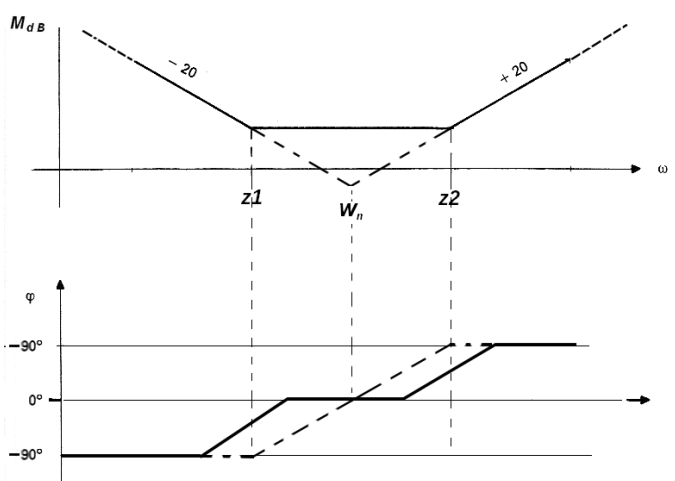
Per ottenere la corretta funzione $G(s)$ è necessario porre in cascata un invertitore di tensione.



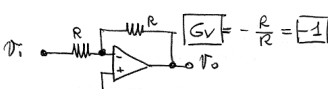
PID



$G(s) = K_p + K_i/s + K_d s$
 Dati K_p , K_i , K_d
 Verificare che $K_p > 2(K_d K_i)^{0.5}$
 Impostare R_1
 $C_2 = K_d/R_1$
 Sistema tra:
 $K_i = 1/(R_2 C_1)$
 $K_p = (R_2 C_2 + R_1 C_1)/(R_2 C_1)$



Per ottenere la corretta funzione $G(s)$ è necessario porre in cascata un invertitore di tensione.



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