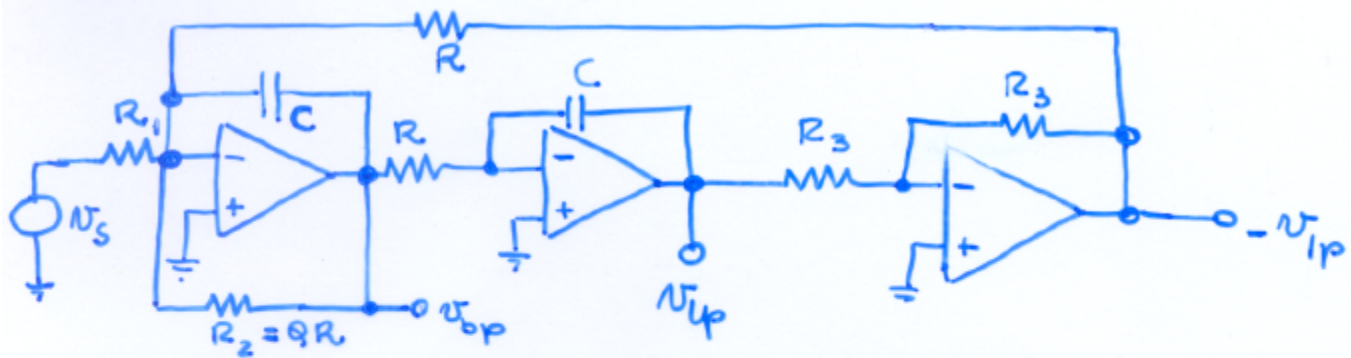


UNIVERSAL ACTIVE FILTERS (I)



$$V_{bp}(s) = -\frac{1}{sR_1C} V_s(s) - \frac{1}{sRC} (-V_{lp}) - \frac{1}{sCR_2} V_{bp}(s) \quad (1)$$

$$V_{lp}(s) = -V_{bp} \left(\frac{1}{sRC} \right) \quad (2)$$

Sostituendo (2) in (1)

$$V_{bp}(s) = -\frac{1}{sR_1C} V_s(s) - \frac{1}{(sRC)^2} V_{bp}(s) - \frac{1}{sCR_2} V_{bp}(s)$$



$$\begin{aligned} \frac{V_{bp}}{V_s}(s) &= \frac{-\frac{1}{sR_1C}}{1 + \frac{1}{sCR_2} + \frac{1}{s^2C^2R^2}} = \\ &= \frac{s/R_1C}{s^2 + s \frac{1}{CR_2} + \frac{1}{C^2R^2}} = \\ &= \frac{-\left(\frac{R}{R_1}\right) \frac{s}{RC}}{s^2 + s \left(\frac{R}{R_2}\right) \frac{1}{RC} + \frac{1}{R^2C^2}} = \\ &= K \frac{s\omega_0}{s^2 + s \frac{\omega_0}{Q} + \omega_0^2} \end{aligned}$$

$$\begin{cases} \omega_0 = 1/RC \\ K = R/R_1 \\ Q = R_2/R \end{cases}$$

↓ FILTRO PASSA-BASSO DEL SECONDO ORDINE

$$V_{lp}(s) = K \frac{\omega_0^2}{s^2 + s \frac{\omega_0}{Q} + \omega_0^2}$$

ω_0, K, Q possono essere definiti indipendentemente.