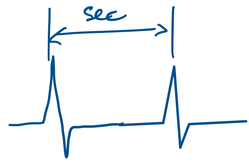
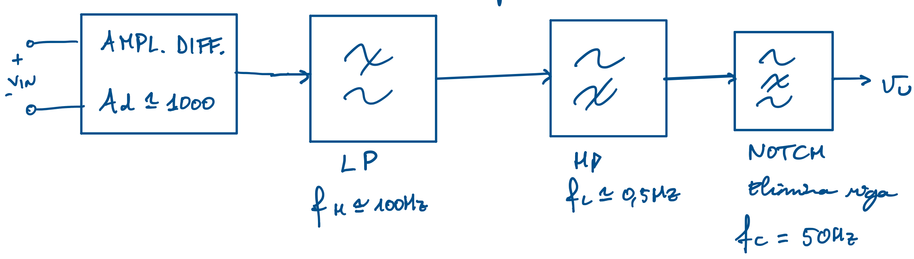
ECG FRONT-END

Tuesday, 20 November 2018 08:58

Schema a blocchi

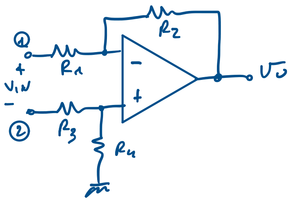




LP
$f_H \cong 100Hz$

HP
$f_L \cong 0{,}5Hz$

NOTCH
Elimina rete
$f_c = 50Hz$

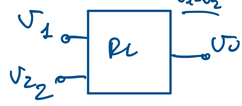


$$V_U = -\frac{R_2}{R_1} V_{IN} + V_{U_C}$$

tensione d'uscita dovuta dal modo comune (E delle resistenze $\neq 0$)

Se $\frac{R_2}{R_1} = \frac{R_4}{R_3}$

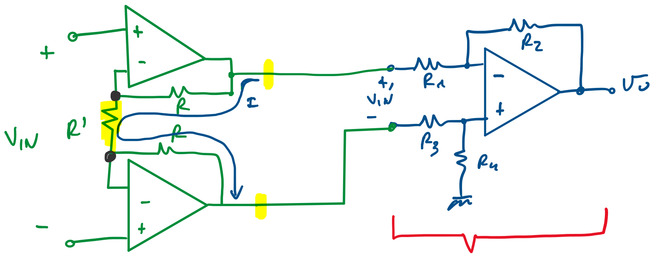
$$V_U = A_d V_d + A_c V_c \qquad V_c = \frac{V_1 + V_2}{2} \qquad V_d = V_2 - V_1$$



Problema #1: bisogna mantenere costante il rapporto delle resistenze.

Problema #2: R_V da 1 e 2 $\neq \infty$

$R_{V1} \neq R_{V2}$ $\qquad R_{V2} = R_3 + R_4$ $\qquad R_{V1} = R_1$



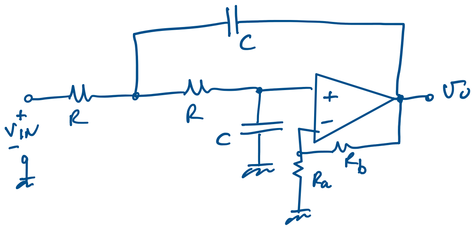
$$V_U = -\frac{R_2}{R_1} V_{IN}'$$

$$I = \frac{V_{IN}}{R'} \qquad V_{IN}' = (2R + R') \cdot I = (2R + R')\frac{V_{IN}}{R'}$$

$$V_U = -\frac{R_2}{R_1}(2R + R')\frac{V_{IN}}{R'} = -\frac{R_2}{R_1}\left(\frac{2R}{R'} + 1\right) V_{IN}$$

A_d

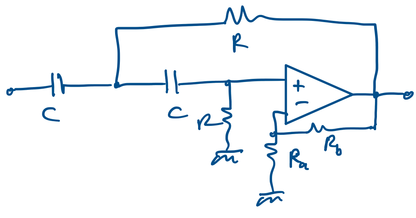
LP



$$H(s) = \frac{A_V}{R^2C^2s^2 + (3 - A_V)RCs + 1}$$

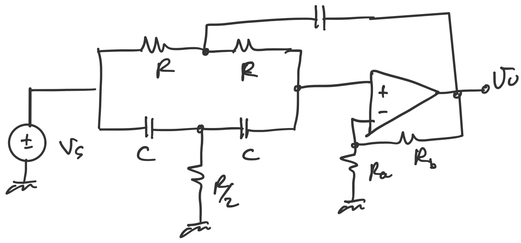
$$A_V = \left(\frac{R_b}{R_a} + 1\right) \qquad A_V < 3$$

HP



$$H(s) = \frac{A_V R^2C^2s^2}{R^2C^2s^2 + (3 - A_V)RCs + 1}$$

NOTCH filtro a doppio T pontato



$$H(s) = \frac{(1 + R^2C^2s^2)A_V}{R^2C^2s^2 + (2 - A_V) \cdot 2RCs + 1}$$

$A_V < 2$

MATLAB: $R_{IN} = 2M\Omega$; $R_{OUT} = 25\Omega$; $A_{VOLP} = 250{\cdot}000$; BW $= 1{\cdot}000{\cdot}000$