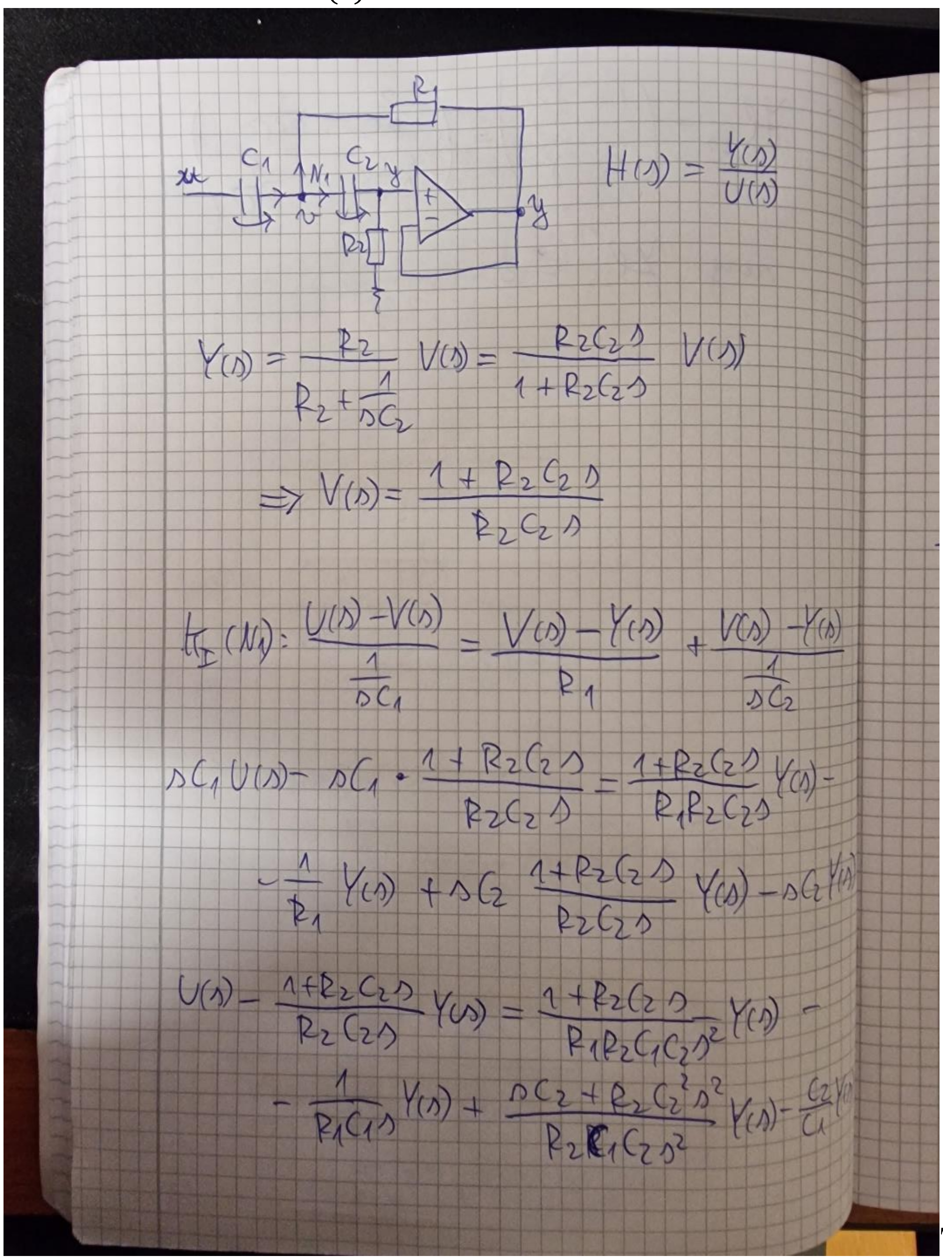
Tema curs 1

Determinarea functiei de transfer a unui FTS in montak neinversor dupa formula $H(s) = \frac{Y(s)}{U(s)}$



$$H(s) = \frac{Y(s)}{U(s)}$$

$$Y(s) = \frac{R_2}{R_2 + \frac{1}{sC_2}} V(s) = \frac{R_2C_2s}{1+R_2C_2s} V(s)$$

$$\Rightarrow V(s) = \frac{1+R_2C_2s}{R_2C_2s}$$

$$K_I(N_1): \frac{U(s)-V(s)}{\frac{1}{sC_1}} = \frac{V(s)-Y(s)}{R_1} + \frac{V(s)-Y(s)}{\frac{1}{sC_2}}$$

$$sC_1U(s) - sC_1 \cdot \frac{1+R_2C_2s}{R_2C_2s} = \frac{1+R_2C_2s}{R_1R_2C_2s} Y(s) -$$

$$-\frac{1}{R_1} Y(s) + sC_2 \frac{1+R_2C_2s}{R_2C_2s} Y(s) - sC_2Y(s)$$

$$U(s) - \frac{1+R_2C_2s}{R_2C_2s} Y(s) = \frac{1+R_2C_2s}{R_1R_2C_1C_2s^2} Y(s) -$$

$$-\frac{1}{R_1C_1s} Y(s) + \frac{sC_2 + R_2C_2^2s^2}{R_2C_1C_2s^2} Y(s) - \frac{C_2}{C_1} Y(s)$$

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$$U(s) = Y(s)\frac{\left(R_1C_1s + R_1C_1R_2C_2s^2 + 1 + \cancel{R_2C_2s} + R_1C_2s - \cancel{R_2C_2s} + \cancel{R_1R_2C_2^2s^2} - \cancel{R_1R_2C_2^2s^2}\right)}{R_1R_2C_1C_2s^2}$$

$$\frac{Y(s)}{U(s)} = \frac{R_1R_2C_1C_2s^2}{R_1R_2C_1C_2s^2 + (R_1C_1 + R_1C_2)s + 1}$$

$$\frac{Y(s)}{U(s)} = \frac{\cancel{R_1R_2C_1C_2}\, s^2}{\cancel{R_1R_2C_1C_2}\left(s^2 + \left(\frac{1}{R_2C_2} + \frac{1}{R_2C_1}\right)s + \frac{1}{R_1R_2C_1C_2}\right)}$$

$$H(s) = \frac{s^2}{s^2 + \frac{1}{R_2}\left(\frac{1}{C_1} + \frac{1}{C_2}\right)s + \frac{1}{R_1R_2C_1C_2}}$$