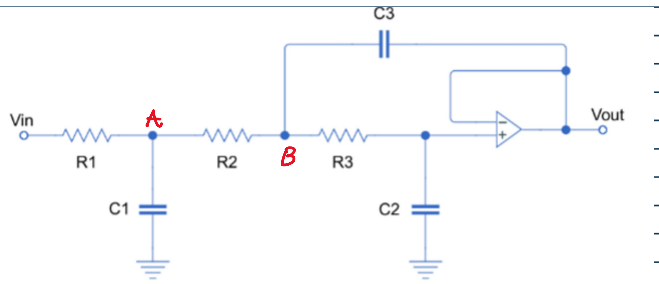
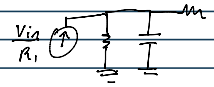
1/10/23 pre lab

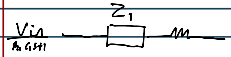
Monday, January 9, 2023 5:16 PM



transformamos la fuente de entrada

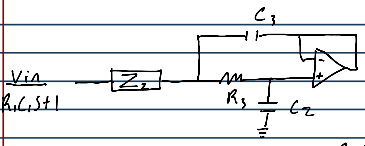


$R_1 \| C_1$



$Z_1 + R_2$

terminamos con



$$Z_2 = \frac{R_1}{R_1C_1S+1} + R_2 \approx \frac{R_1R_2C_1S + R_2 + R_1}{R_1C_1S+1}$$

Sabemos que la FT de un sallen key es

$$\frac{V_{out}}{\frac{V_{in}}{R_1C_1S+1}} = \frac{1}{R_3Z_2C_2C_3S^2 + C_2(Z_2+R_3)S + 1}$$

$$= \frac{1}{(R_1C_1S+1)\left(R_3\left[\frac{R_1R_2C_1S + R_2 + R_1}{R_1C_1S+1}\right]C_2C_3S^2 + (R_1C_1S+1)\right]C_2\left(\frac{R_1R_2C_1S + R_2 + R_1}{R_1C_1S+1} + R_3\right)S + R_1C_1S+1}$$

$$\frac{V_{out}}{V_{in}} = \frac{1}{R_1R_2R_3C_1C_2C_3S^3 + (R_1+R_2)R_3C_2C_3S^2 + C_2C_1R_2R_1S^2 + C_2(R_1+R_2)S + C_2R_3(R_1C_1+1)S + R_1C_1S+1)}$$

$$= \frac{1}{R_1R_2R_3C_1C_2C_3S^3 + [(R_1+R_2)R_3C_3 + R_1C_1(R_2+R_3)]S^2 + [R_1C_1 + C_2(R_1+R_2+R_3)]S + 1}$$