

9 Other circuits with an operational amplifier

1) Taskk

Estimate the change in phase shift in the system from Fig.1 with changes in the value of R_3 from 0 to 1M. For calculations assume: $R_1 = 1 \text{ k}\Omega$, $R_2 = 1 \text{ k}\Omega$, $C = 1 \text{ nF}$ (run simulations in LTspice).

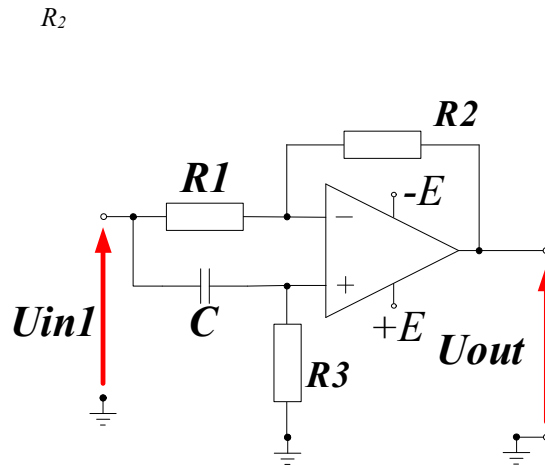


Fig.1 . All-pass filter.

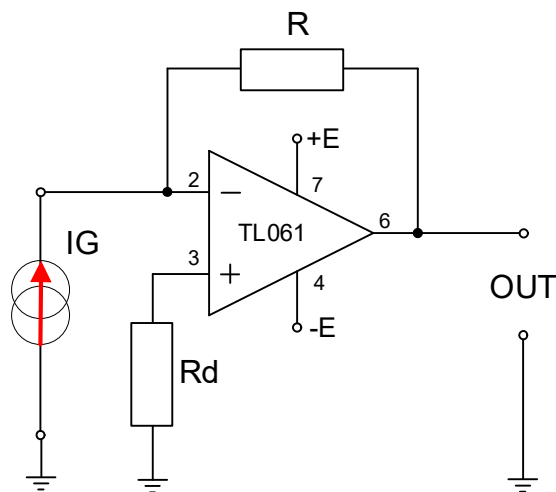


Fig.2 . Transimpedance amplifier.

2) Taskk

Determine the value of the output voltage in the circuit from Fig.2 . For calculations, assume: $R = 1 \text{ k}\Omega$, $I_G = 5 \text{ mA}$. What is the practical application of such a circuit ?

3) Taskk

Determine the value of the output current (I_L) in the circuit from Fig.3 . For calculations assume: $R = 1 \text{ k}\Omega$, $R_L = 1 \text{ k}\Omega$, $U_{IN} = 5 \text{ V}$, $U_{CC} = 10 \text{ V}$.

4) Task

Determine the value of the output current (I_L) in the circuit from Fig.4 . For calculations assume: $R = 1 \text{ k}\Omega$, $R_L = 1 \text{ k}\Omega$, $U_{IN} = 5 \text{ V}$.

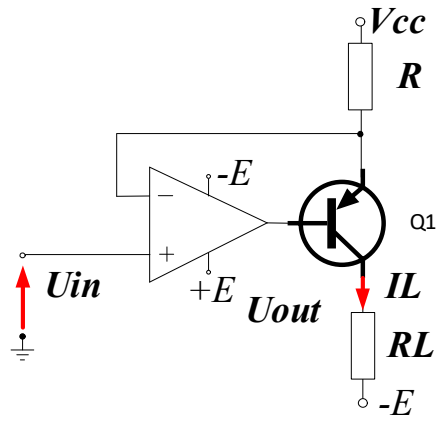


Fig.3 . Controlled current source.

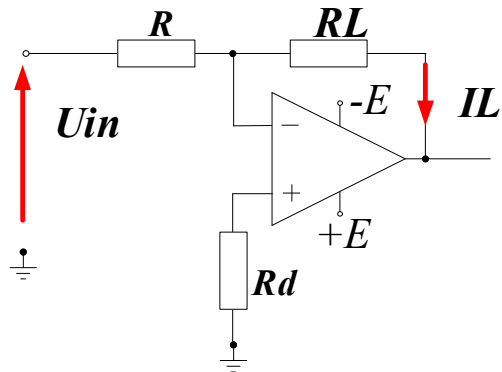


Fig.4 . Controlled current source (underpowered load).