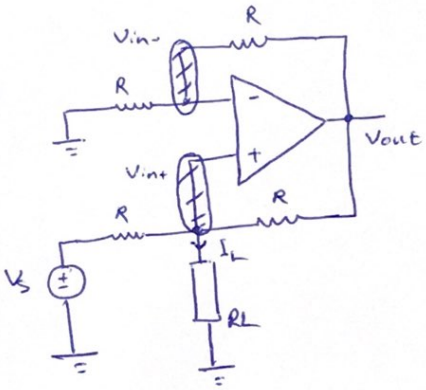
یا لطیف

رضا ادینه پور
۹۸۱۴۳۰۳
پایانترم الکترونیک ۲

#2

الف) Ideal opAmp : $I_L > 5^{mA}$



$V_{in+} = V_{in-}$

KCL @ V_{in+} : $\frac{V_{in+} - V_S}{R} + I_L + \frac{V_{in+} - V_o}{R} = 0$ (I)

KCL @ V_{in-} : $\frac{V_{in-} - 0}{R} + \frac{V_{in-} - V_{out}}{R} = 0 \Rightarrow V_{out} = 2V_{in-} \xrightarrow{V_{in-} = V_{in+}} \boxed{V_{out} = 2V_{in+}}$ (II)

$\xrightarrow{(II) \text{ in } (I)} \frac{2V_{in+}}{R} - \frac{V_S}{R} - \frac{V_{out}}{V_S} = -I_L \Rightarrow I_L = \frac{V_S}{R} > 5^{mA}$

$\Rightarrow \begin{cases} V_S > 5R \\ R \neq 0 \end{cases} \longrightarrow$ if $R = 1^K \Rightarrow V_S > 5^V$

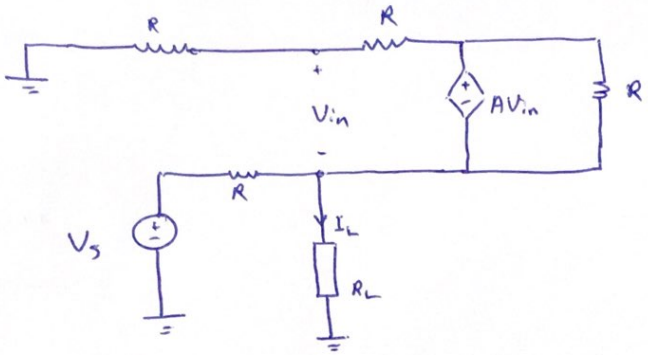
ب) $V_{in+} \neq V_{in-}$

KCL in V_{in-} : $\frac{V_{in(-)}}{R} + \frac{V_{in(-)} - V_{out}}{R} = 0 \Rightarrow V_{in(-)}\left(\frac{1}{R} + \frac{1}{R}\right) = \frac{V_{out}}{R}$

$\Rightarrow \frac{2}{R} V_{in(-)} = \frac{V_{out}}{R}$ (I)

KCL in $V_{in(+)}$: $\frac{V_{in(+)} - V_S}{R} + \frac{V_{in(+)} - V_{out}}{R} + I_L = 0$

$\Rightarrow \frac{2}{R} V_{in(+)} - \frac{V_S}{R} - \frac{V_{out}}{R} = I_L$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