Dr Satvir Singh

LINEAR INTEGRATED CIRCUITS

3-02

Peaking Amplifier

Peaking Amplifier

Amplifier Gain is given as

$$A_P = -\frac{R_F || Z_{LC}}{R}$$

Where $Z_{LC} = L||C$, which is given as

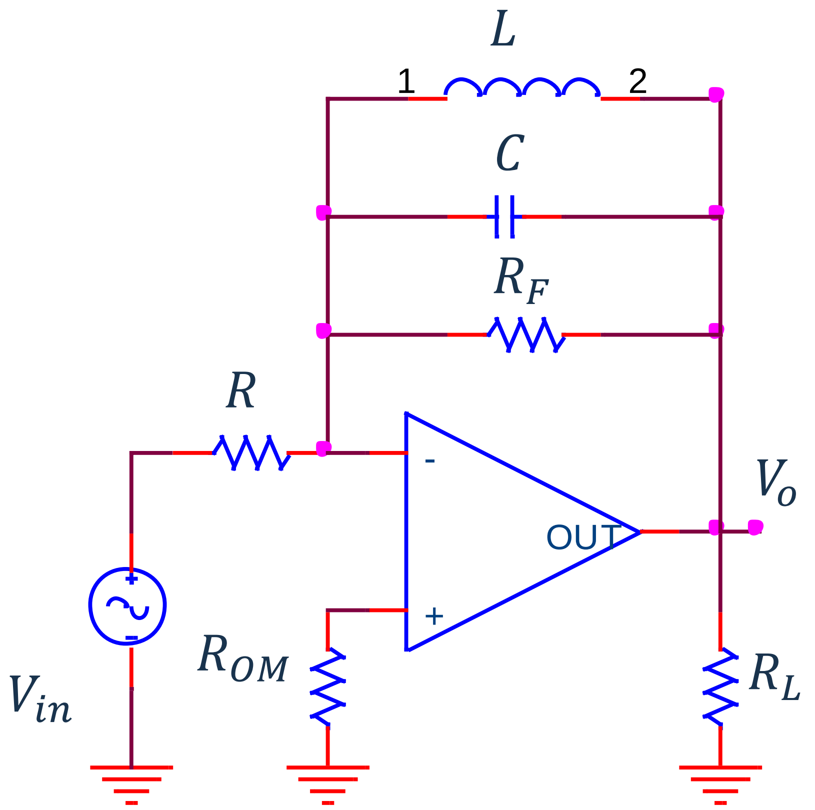
$$\frac{1}{Z_{LC}} = \frac{1}{j\omega L} + j\omega C$$

$$Z_{LC} = \frac{j\omega L}{1 - \omega^2 LC}$$

Resonant frequency of parallel LC network is given as

$$1 - \omega^2 LC = 0 \quad \rightarrow \quad \omega^2 = LC$$

$$\boldsymbol{f_P = \frac{1}{2\pi\sqrt{LC}}}$$



Peaking Amplifier

At resonant frequency, impedance $Z_{LC} = \infty$ and the amplifier gain becomes

$$\boldsymbol{A_P = -\frac{R_F}{R}}$$

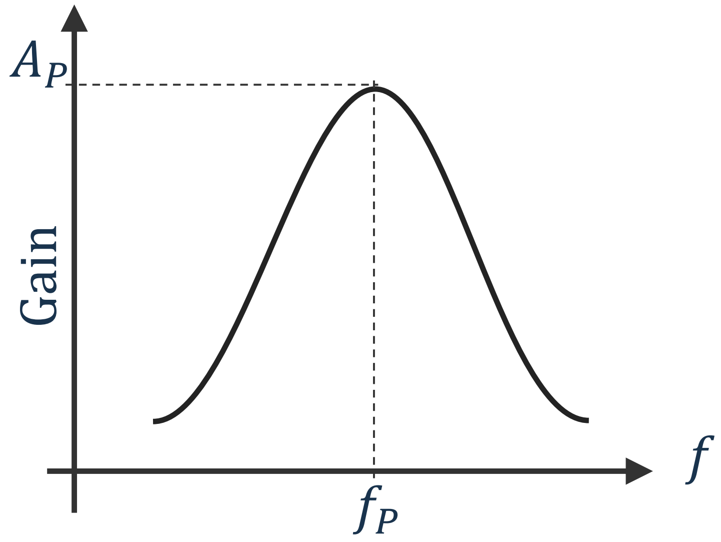
Gain of the amplifier maximizes at a resonant frequency.

Q-factors of C and L are given as

$$Q = \frac{R}{X_L} = \frac{R}{\omega L}, \quad \text{and} \quad Q = \frac{R}{X_C} = \omega C R$$

Q-factor of parallel LC network is given by multiplication

$$Q^2 = \frac{R}{\omega L}\omega C R \quad \rightarrow \quad \boldsymbol{Q = R\sqrt{\frac{C}{L}}}$$



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Thank You