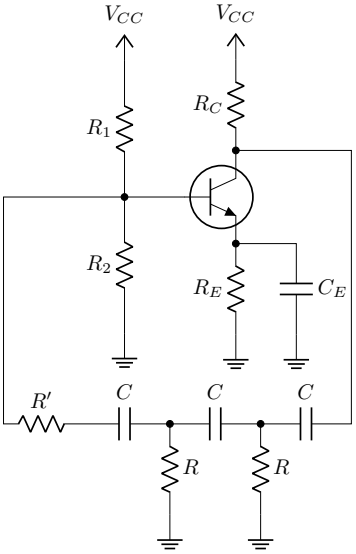
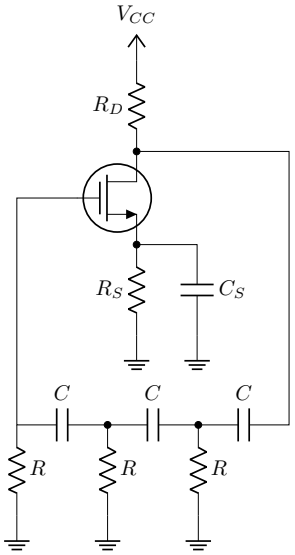
Chapter 5: Oscillators



Phase Shift Oscillator (BJT)

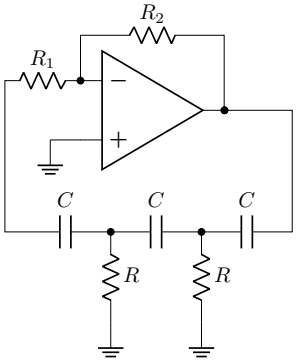
$$f_0 = \frac{1}{2\pi RC}\frac{1}{\sqrt{6+4R_C/R}}$$



Phase Shift Oscillator (MOSFET)

$$f_0 = \frac{1}{2\pi RC\sqrt{6}}$$

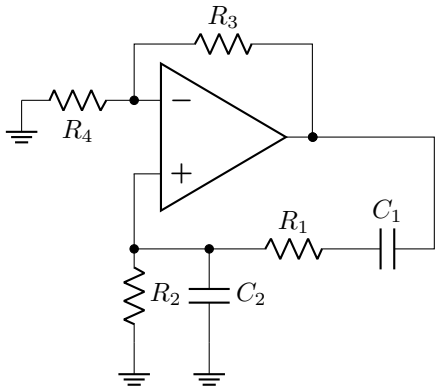
$$A = 29$$



Phase Shift Oscillator (Op Amp)

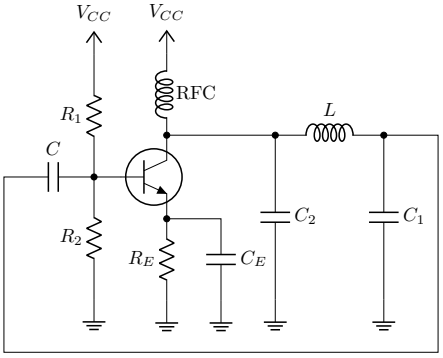
$$f_0 = \frac{1}{2\pi RC\sqrt{6}}$$

$$A = 29$$



Wien-Bridge Oscillator

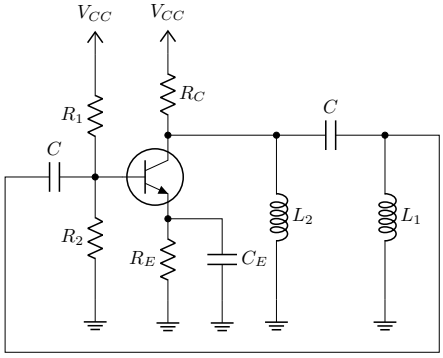
$$\omega_0 = \frac{1}{\sqrt{R_1R_2C_1C_2}}$$



Colpitts Oscillator

$$\omega_0 = \sqrt{\frac{C_1+C_2}{C_1C_2L}}$$

$$\beta_f = \frac{C_2}{C_1}$$



Hartly Oscillator

$$\omega_0 = \frac{1}{\sqrt{(L_1+L_2)C}}$$

$$\beta_f = \frac{L_1}{L_2}$$

Chapter 6: Power Amplifiers

Class A	Class B	Class AB
$\mu \in [0.25-0.5]$	$\mu \le 0.785$	$\mu \le 0.6$
$P_L = \frac{{V_o}^2}{2R_L}$	$P_L = \frac{{V_o}^2}{2R_L}$	$i = I_s e^{V_{BB}/2V_T}$
$P_{L(\max)} = \frac{{V_{CC}}^2}{8R_L}$	$I_C = \frac{V_o}{\pi R_L}$	$i_n i_p = {I_Q}^2$
$P_{DC} = \frac{{V_{CC}}^2}{2R_L}$	$P_{DC} = \frac{2V_{CC}V_o}{\pi R_L}$	$P_D = V_{CC}I_Q$
$P_D = \frac{{V_{CC}}^2}{4R_L}$		

Chapter 7: Active Filters

$$\varepsilon = \sqrt{10^{\frac{A_{\max}}{10}} - 1} \quad ; \quad N \ge \frac{\log\left(\frac{10^{A_{\min}/10}-1}{\varepsilon^2}\right)}{2\log\left(\frac{\omega_s}{\omega_p}\right)}$$

$$A_{\mathrm{dB}} = 10\log\left(1+\varepsilon^2\left(\frac{\omega}{\omega_p}\right)^{2N}\right)$$

$$p_0 = \omega_0 e^{j\left(\frac{\pi}{2N}+\frac{\pi}{2}\right)} \quad ; \quad p_{k+1} = p_k e^{j\frac{\pi}{N}} \quad ; \quad \omega_0 = \omega_p \varepsilon^{-\frac{1}{N}}$$

$$T(s) = \frac{K{\omega_0}^N}{\prod_{k=1}^{N}(s-p_k)}$$