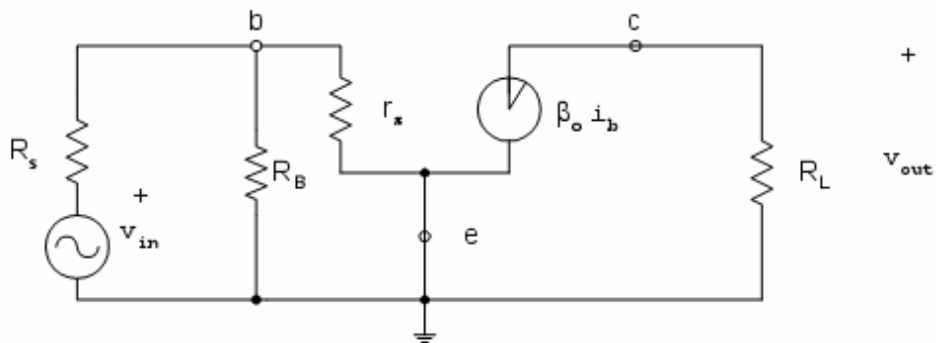
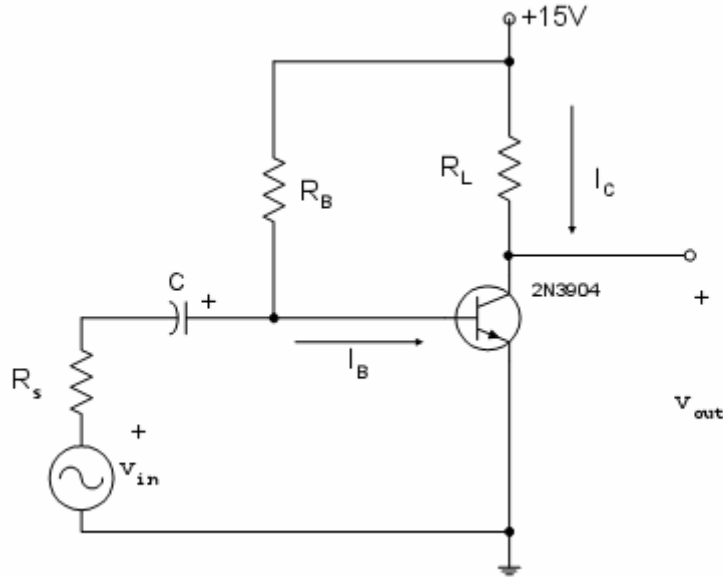


晶体放大器的结构及混合 π 型等效电路

共模放大器

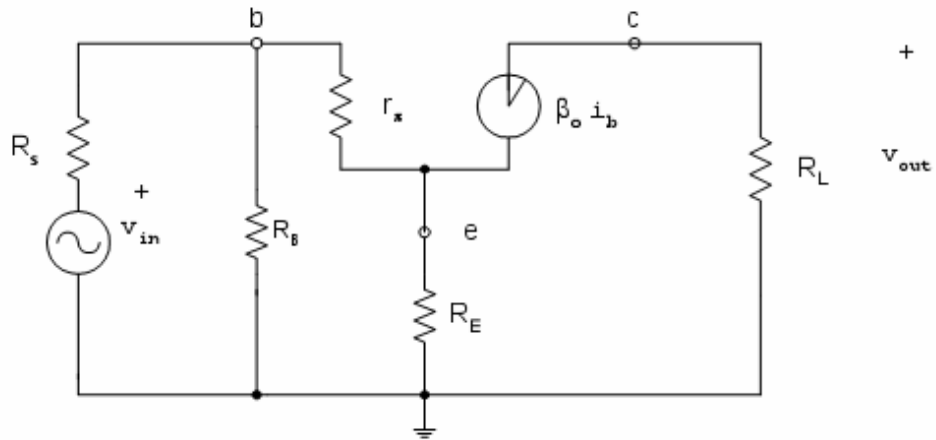
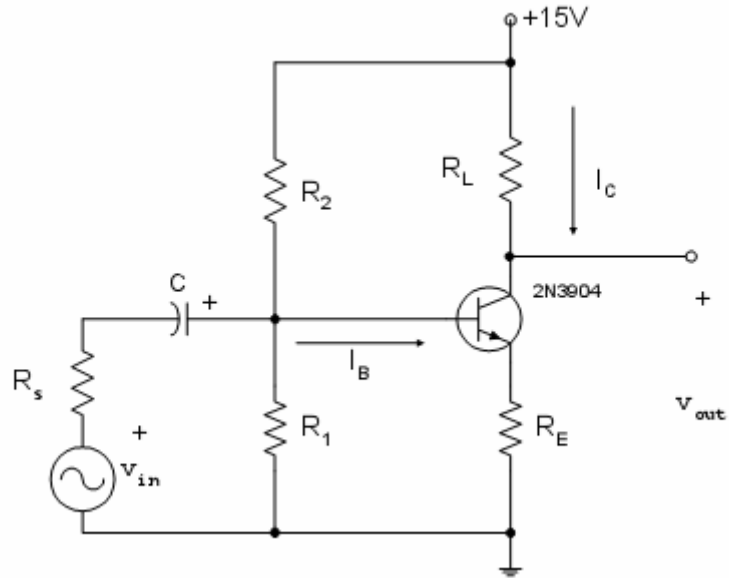


$$A_v = \frac{v_{out}}{v_{in}} = \frac{-\beta_o i_b R_L}{i_b [R_s + r_{\pi}]} = \frac{-\beta_o R_L}{R_s + r_{\pi}}$$

如果 $R_s \ll r_{\pi}$, 则 $A_v = \frac{-\beta_o R_L}{\frac{\beta_o}{g_m}} = -g_m R_L$

晶体放大器的结构及混合 π 型等效电路

有负反馈电阻的共模放大器

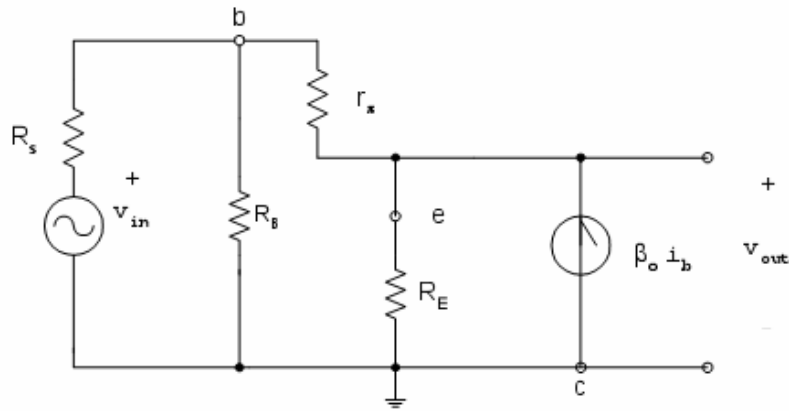
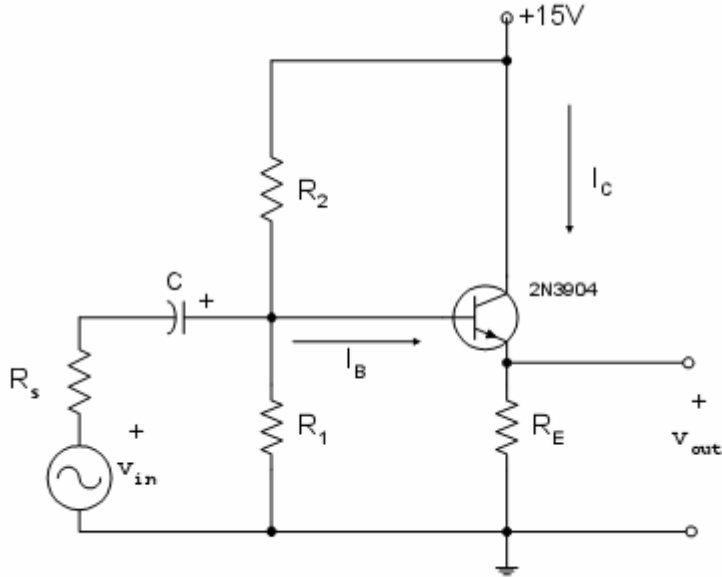


$$A_v = \frac{v_{out}}{v_{in}} = \frac{-\beta_o i_b R_L}{i_b [R_s + r_{\pi} + (\beta_o + 1)R_E]} = \frac{-\beta_o R_L}{R_s + r_{\pi} + (\beta_o + 1)R_E};$$

如果 $R_s + r_{\pi} \ll (\beta_o + 1)R_E$; 则 $A_v \approx -R_L / R_E$

晶体放大器的结构及混合 π 型等效电路

共射放大器[射随器]



$$A_v = \frac{v_{out}}{v_{in}} = \frac{(\beta_o + 1)i_b R_E}{i_b [R_S + r_{\pi} + (\beta_o + 1)R_E]} = \frac{(\beta_o + 1) R_E}{R_S + r_{\pi} + (\beta_o + 1)R_E};$$

如果 $R_S + r_{\pi} \ll (\beta_o + 1)R_E$; 则 $A_v \approx 1$