节点电压法

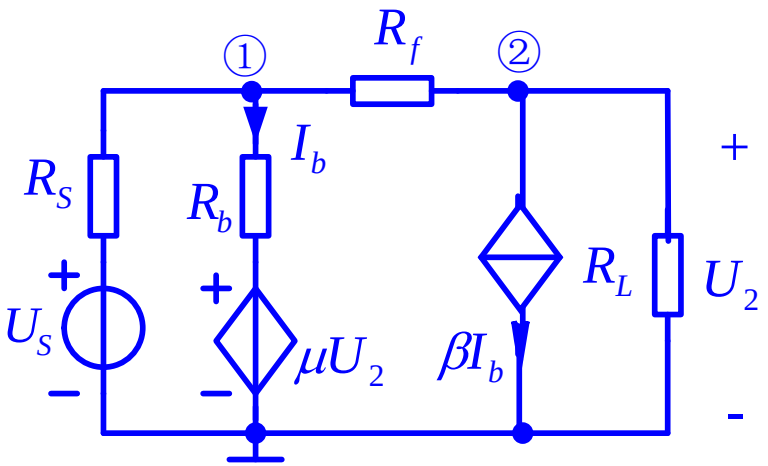
例2 列出图示电路的节点电压方程。

解：

1. 对节点①、②列出节点电压方程

$$\left(\frac{1}{R_S}+\frac{1}{R_b}+\frac{1}{R_f}\right)U_{n1}-\frac{1}{R_f}U_{n2}=\frac{U_S}{R_S}+\frac{\mu U_2}{R_b}$$

$$-\frac{1}{R_f}U_{n1}+\left(\frac{1}{R_f}+\frac{1}{R_L}\right)U_{n2}=-\beta I_b$$



2. 把受控电源的控制量用节点电压来表示

$$U_2=U_{n2},\quad I_b=\frac{U_{n1}-\mu U_2}{R_b}$$

3. 对方程进行整理：

$$\left.\begin{aligned}\left(\frac{1}{R_S}+\frac{1}{R_b}+\frac{1}{R_f}\right)U_{n1}-\left(\frac{1}{R_f}+\frac{\mu}{R_b}\right)U_{n2}&=\frac{U_S}{R_S}\\ -\left(\frac{1}{R_f}+\frac{\beta}{R_b}\right)U_{n1}+\left(\frac{1}{R_f}+\frac{1}{R_L}-\frac{\beta\mu}{R_L}\right)U_{n2}&=0\end{aligned}\right\}$$