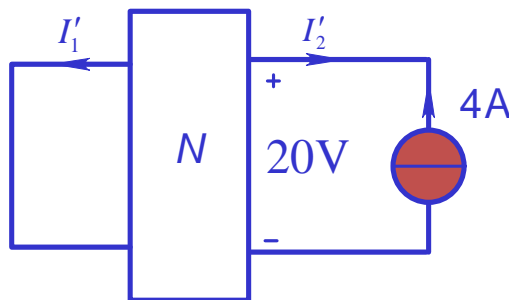
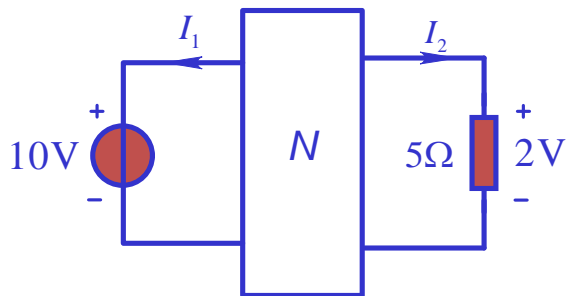


特勒根定理

例1 N 为纯电阻网络，利用特勒根定理求出电流 I'_1 。

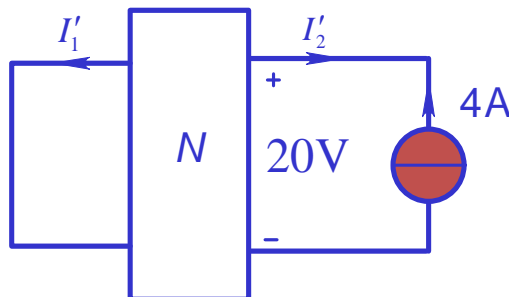
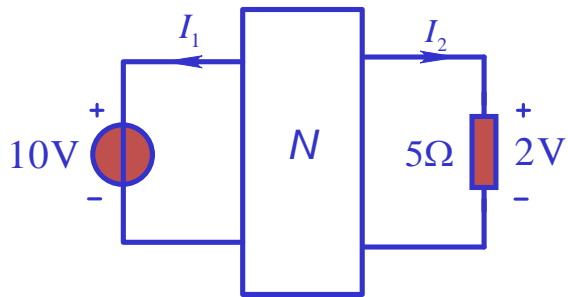


解：设网络内共有 b 条支路，各支路电压和电流取关联参考方向，由特勒根定理得

$$\begin{cases} U_1 I'_1 + U_2 I'_2 + \sum_{k=3}^b U_k I'_k = 0 \\ U'_1 I_1 + U'_2 I_2 + \sum_{k=3}^b U'_k I_k = 0 \end{cases}$$

特勒根定理

例1 N 为纯电阻网络，利用特勒根定理求出电流 I'_1 。



$$U_1 I'_1 + U_2 I'_2 + \sum_{k=3}^b U_k I'_k = 0 \quad U'_1 I_1 + U'_2 I_2 + \sum_{k=3}^b U'_k I_k = 0$$

$$\left\{ \begin{aligned} \sum_{k=3}^b U_k I'_k &= \sum_{k=3}^b R_k I_k I'_k = \sum_{k=3}^b R_k I'_k I_k = \sum_{k=3}^b U'_k I_k \\ U_1 I'_1 + U_2 I'_2 &= U'_1 I_1 + U'_2 I_2 \end{aligned} \right.$$

特勒根定理

$$U_1 I'_1 + U_2 I'_2 = U'_1 I_1 + U'_2 I_2$$

代入已知条件:

对于图(a) $U_1 = 10\text{V}, U_2 = 2\text{V}, I_2 = \frac{2\text{V}}{5\Omega} = 0.4\text{A}$

对于图(b) $U'_1 = 0, U'_2 = 20\text{V}, I'_2 = -4\text{A}$

计算 I'_1

$$10\text{V} \times I'_1 + 2\text{V} \times (-4\text{A}) = 0 \times I_1 + 20\text{V} \times 0.4\text{A}$$

$$\Rightarrow I'_1 = 1.6\text{A}$$

