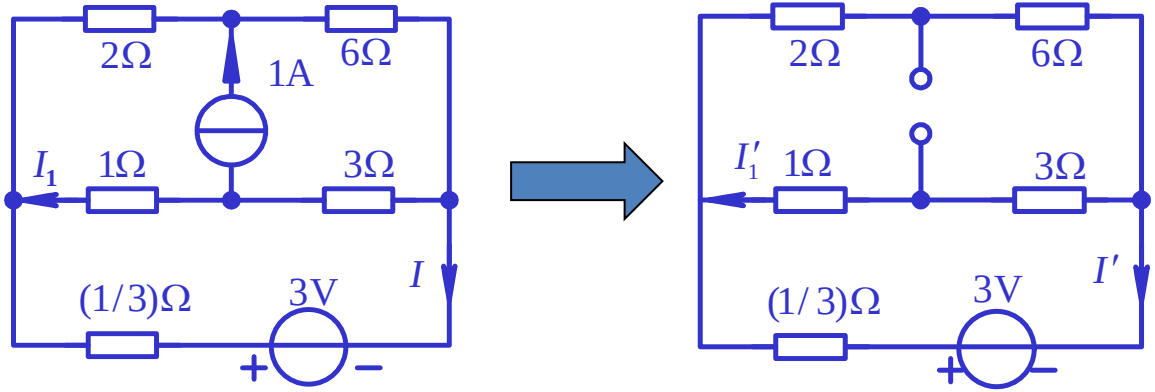
叠加定理例题

例4 用叠加定理求图示电路的电流I及1Ω电阻消耗的功率



解: 1) 3V电压源单独作用

$$I' = \frac{3\text{V}}{\frac{1}{3}\Omega + \frac{4\times 8}{4+8}\Omega} = 1\text{A} \qquad I_1' = -I' \times \frac{8\Omega}{4\Omega + 8\Omega} = -\frac{2}{3}\text{A}$$

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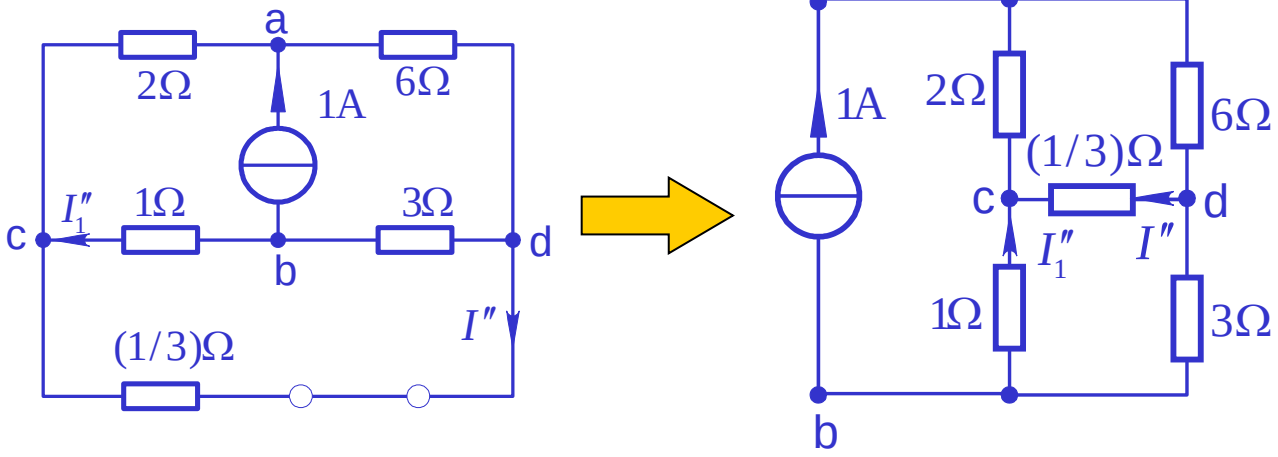
2) 1A电流源单独作用



电桥平衡 $I''=0$

叠加 $I=I'+I''=1\text{A}$

由分流公式：

$$I_1''=-1\text{A}\times\frac{3}{1+3}=-\frac{3}{4}\text{A}$$

$$I_1=I_1'+I_1''=-17/12\text{A}$$

功率 $P_{1\Omega}=1\Omega\times I_1^{\,2}=2.007\text{W}$