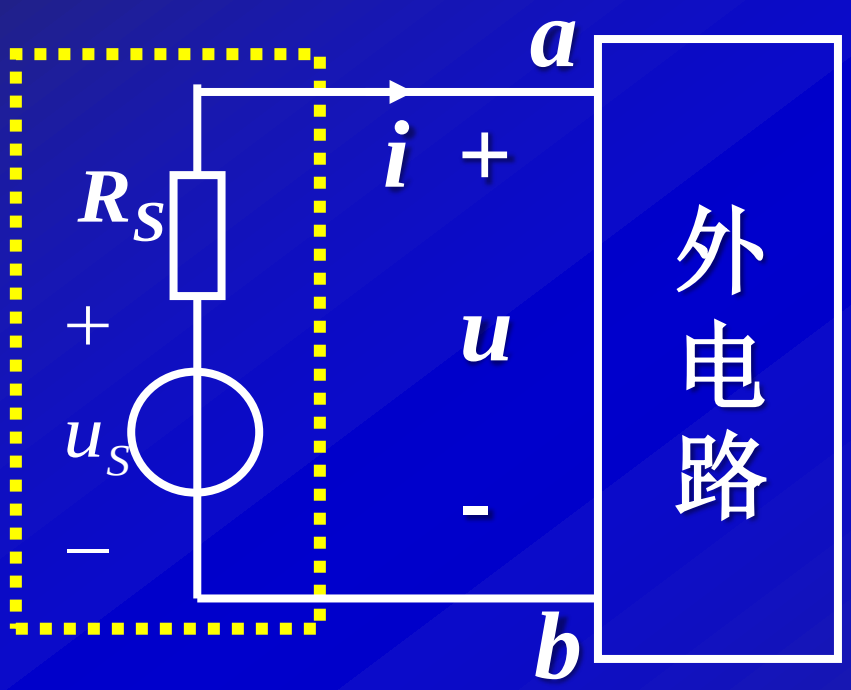
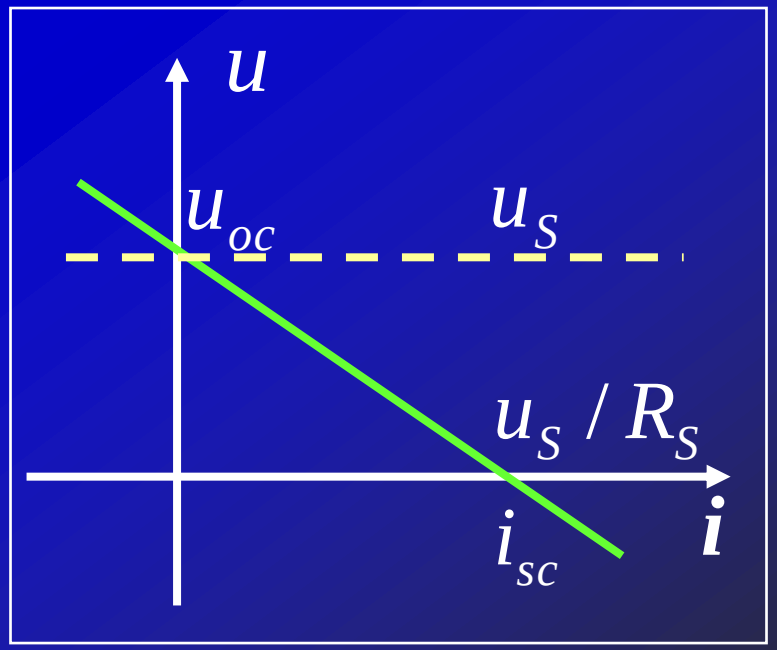
# 实际电源的两种模型及等效变换

## 戴维南电路模型

### 实际电压源模型




**VCR** $u = u_S - R_S i$



*特性：*

（1）$i$ 增大，$R_S$压降增大，$u$ 减小；

（2）$i=0$，$u=u_S=u_{OC}$，开路电压；

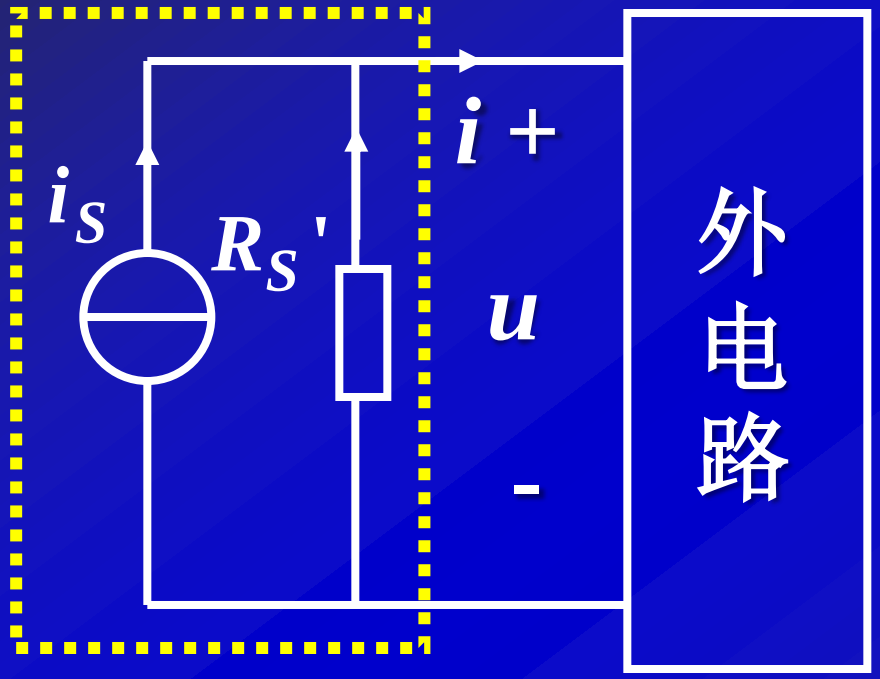
（3）$u=0$，$i=i_{SC}=u_S/R_S$，短路电流，

实际情况中不允许电压源短路；

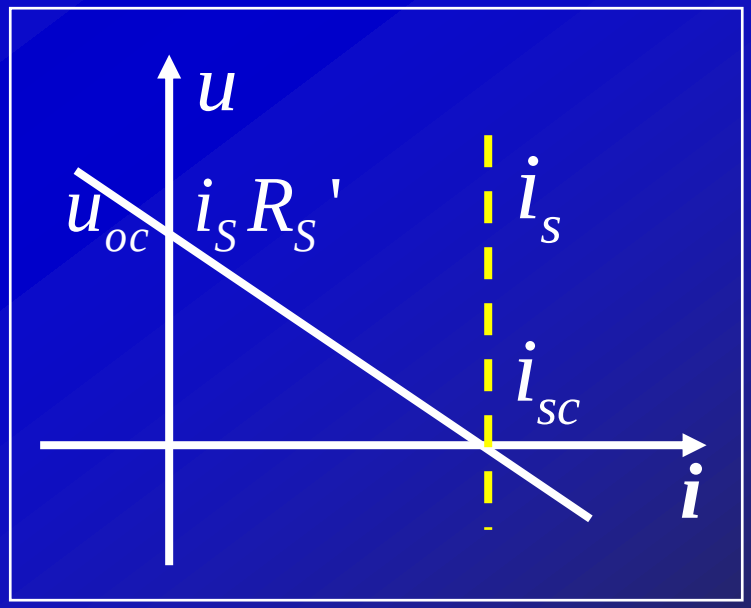
（4）$R_S=0$，理想电压源。

# 诺顿电路模型

## 实际电流源模型




**VCR** $i = i_S - u / R_S'$



## 特性：

（1）$u$ 增大，$R_S$分流增大，$i$ 减小

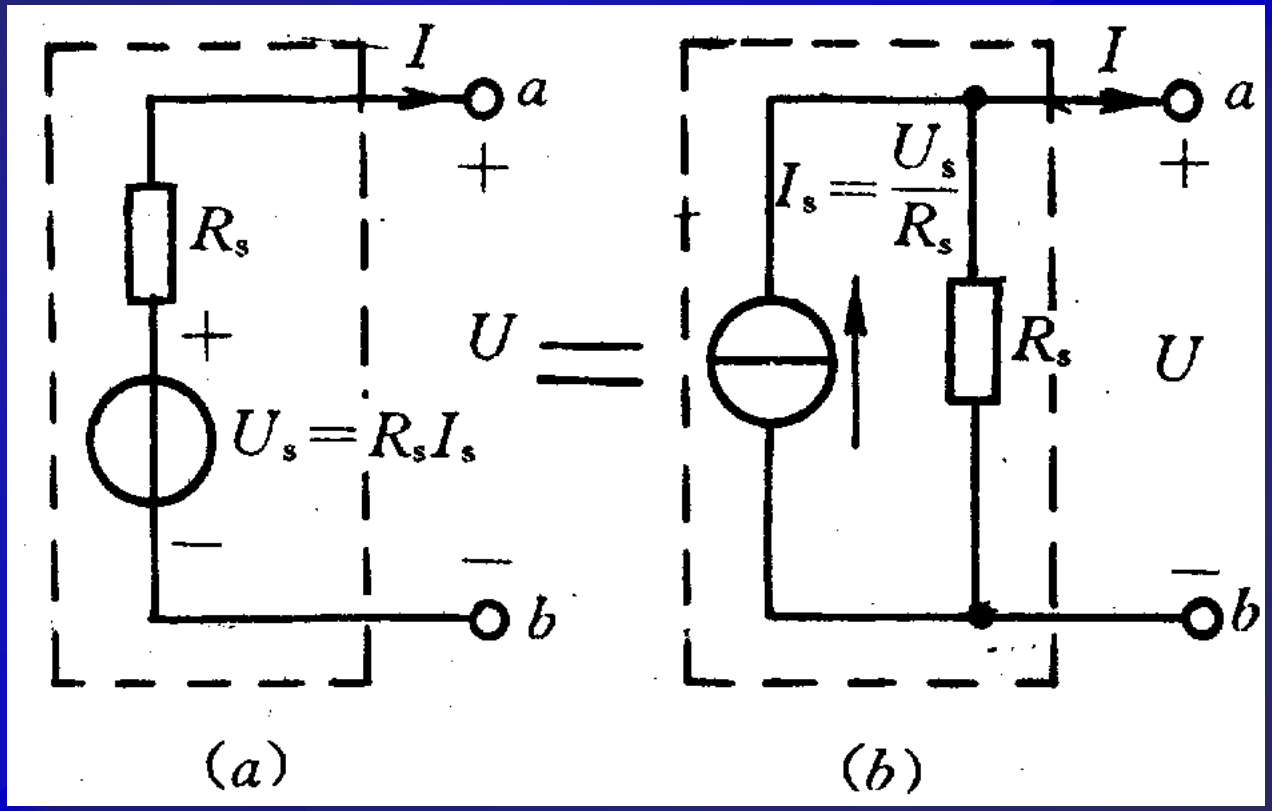
（2）$i=0$，$u=u_{OC}=R_S' i_S$，开路电压

实际情况中不允许电流源开路

（3）$u=0$，$i=i_{SC}=i_S$，短路电流

（4）$R_S$为‘无穷大’，理想电流源

# 两种实际电源的等效变换

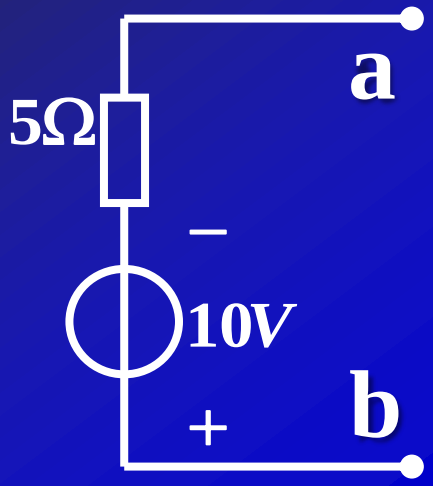


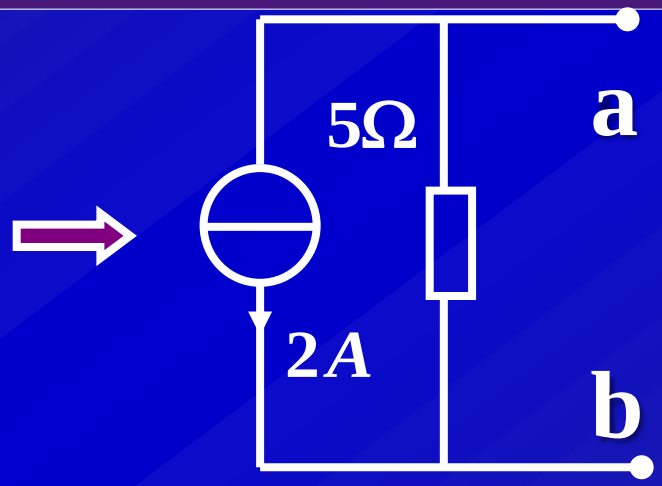

电压源、电流源模型互换等效

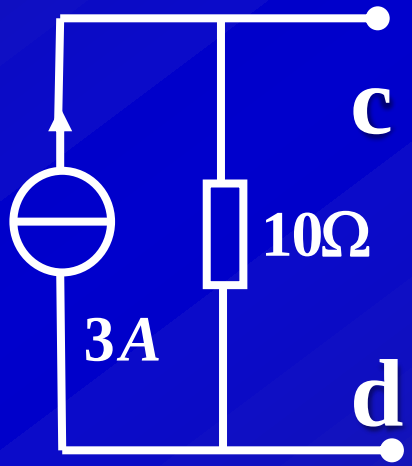
## 几点说明

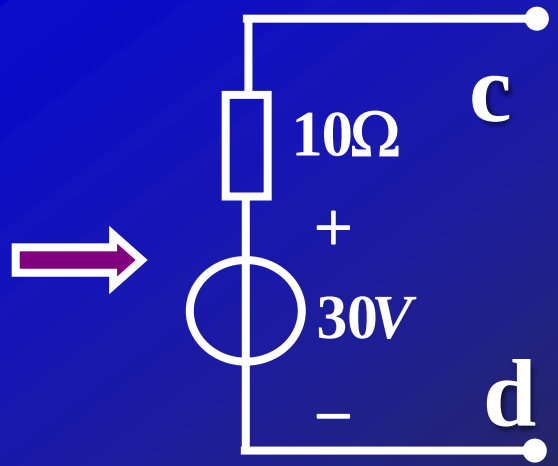
- 作用：电路等效变换
- 对象：有内阻$R_s$的实际电源
- ✓ 理想电压源与理想电流源可以吗？
- 推广：可把外接电阻看作内阻
- 注意：等效端子

# 例9 (P38例2-9)将电源模型等效转换为另一形式

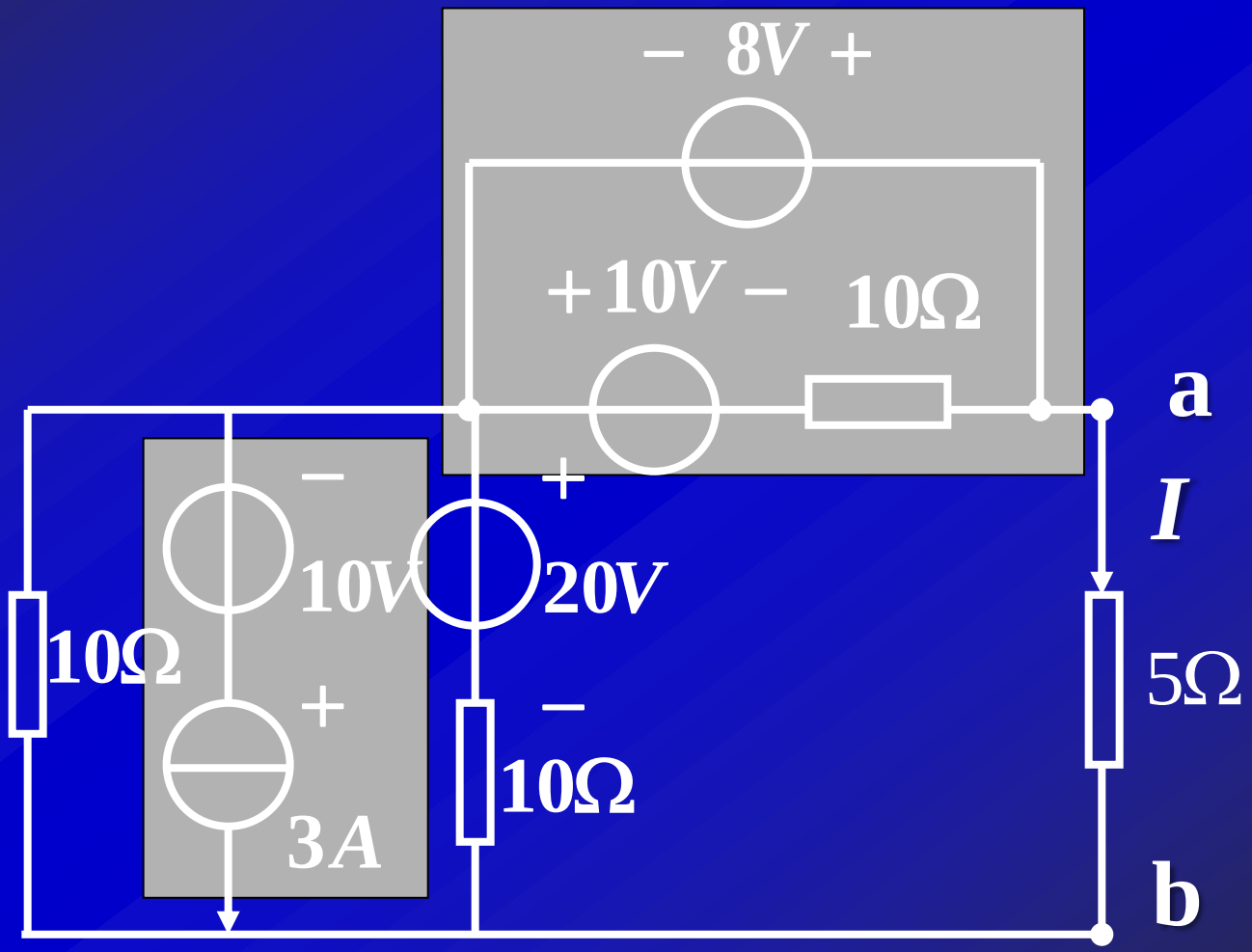


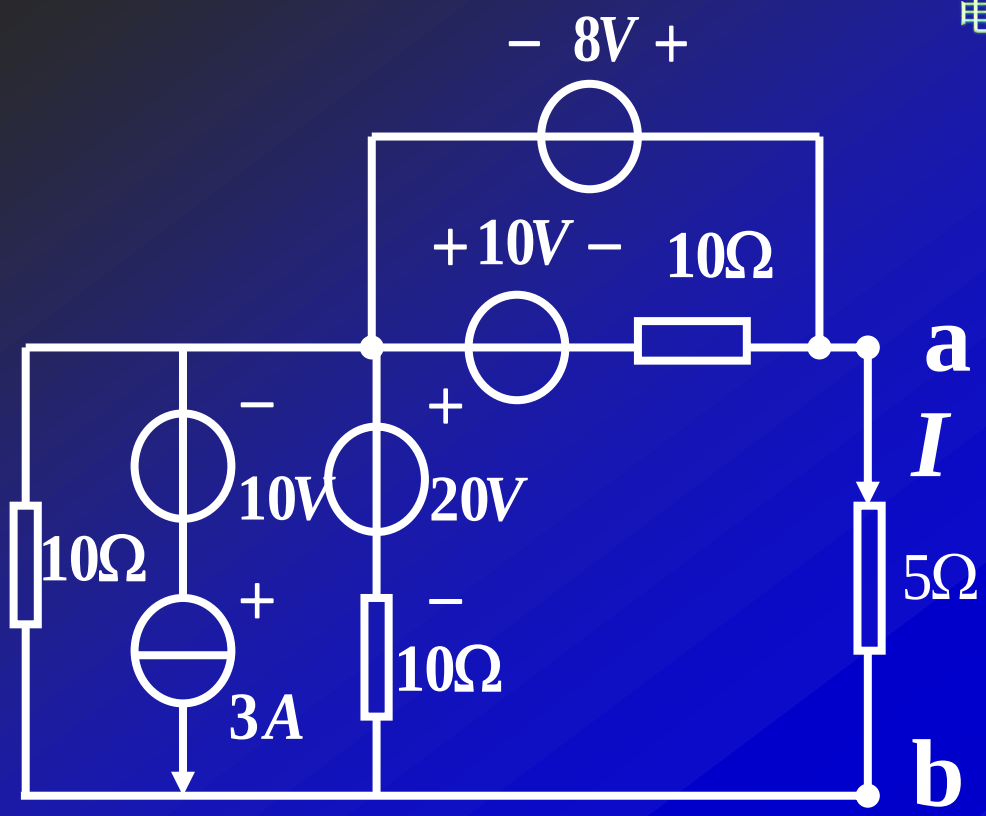



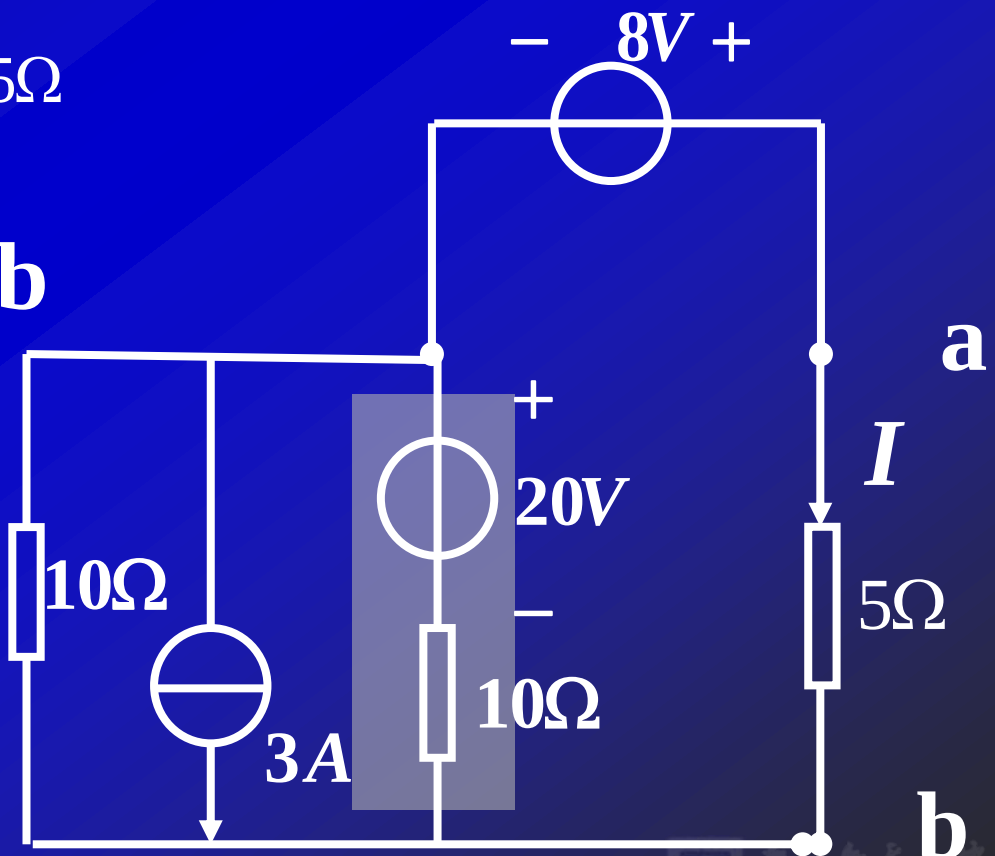



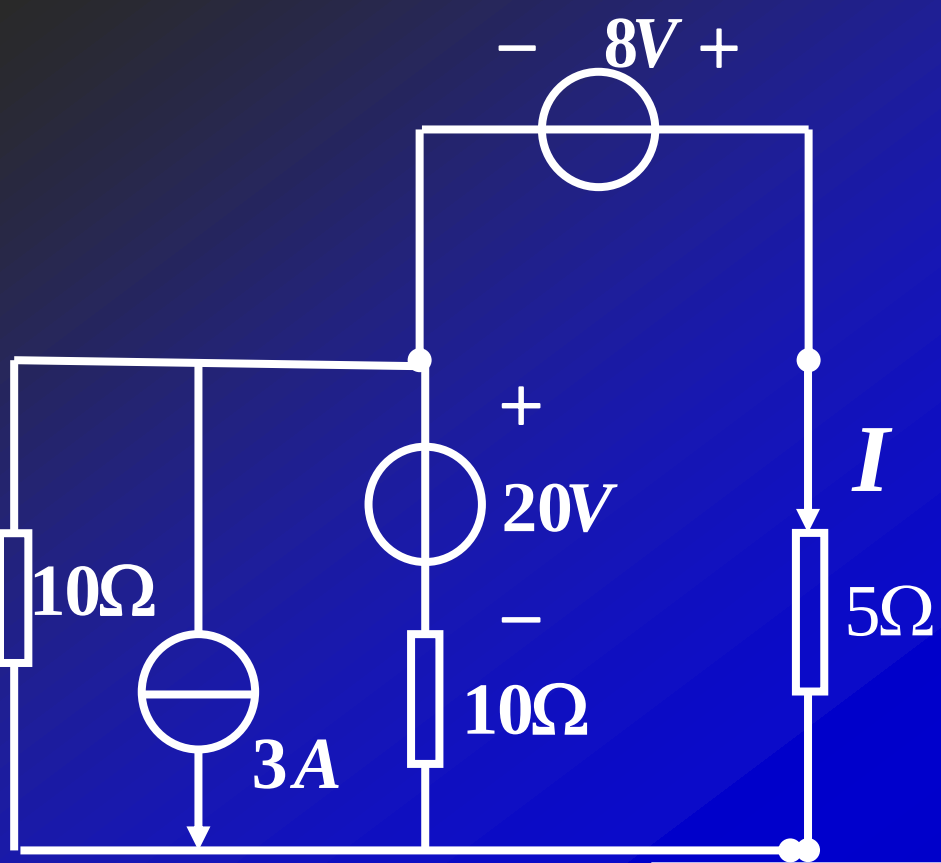
# 例10(P39例2-10) 求电流 $I$ 。



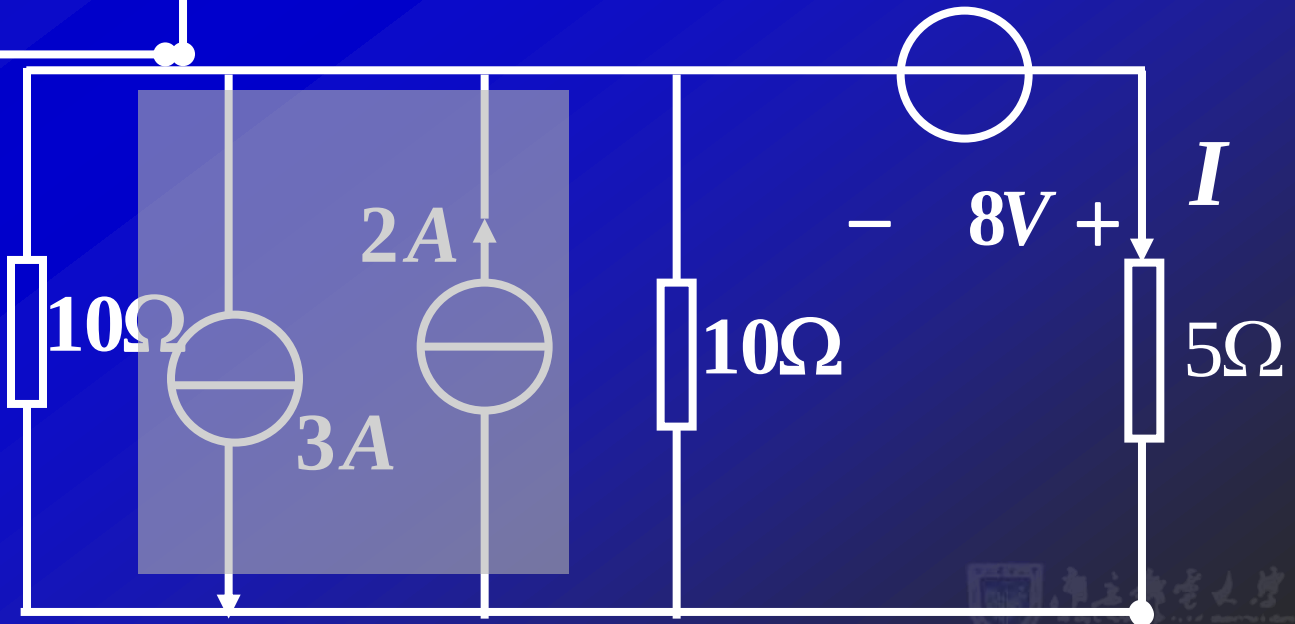


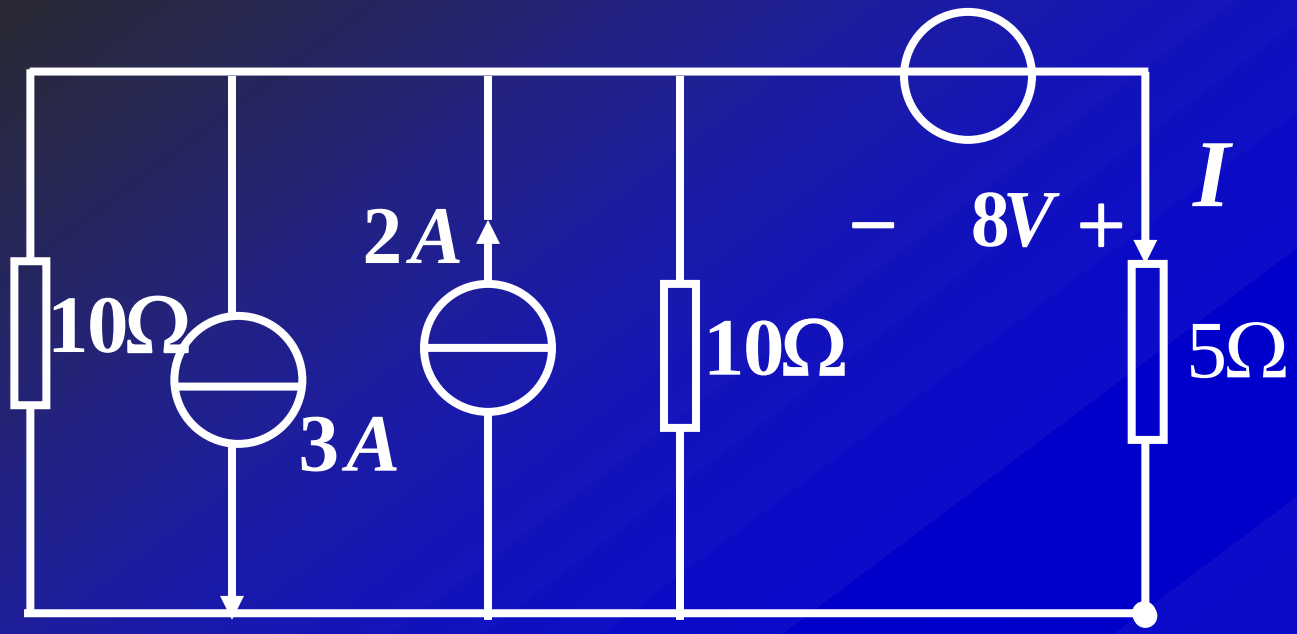

第1步变换



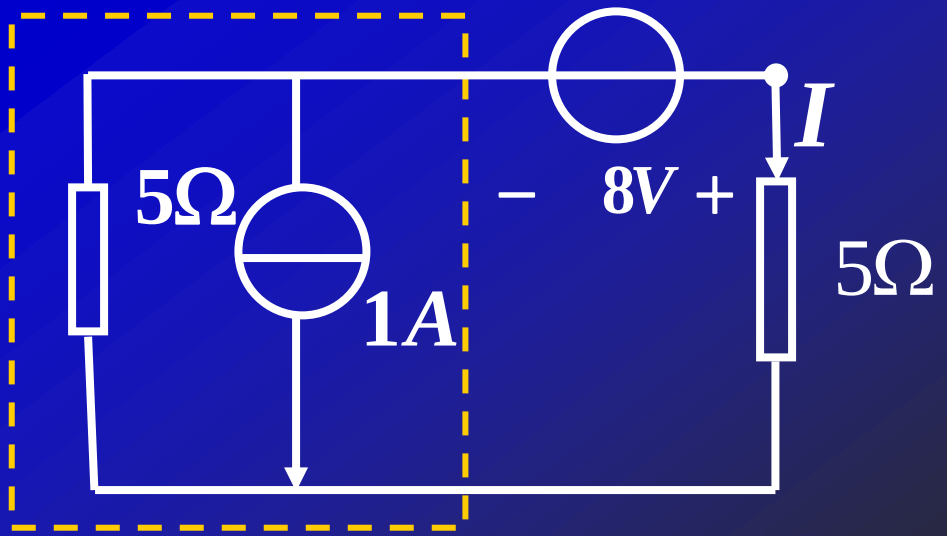


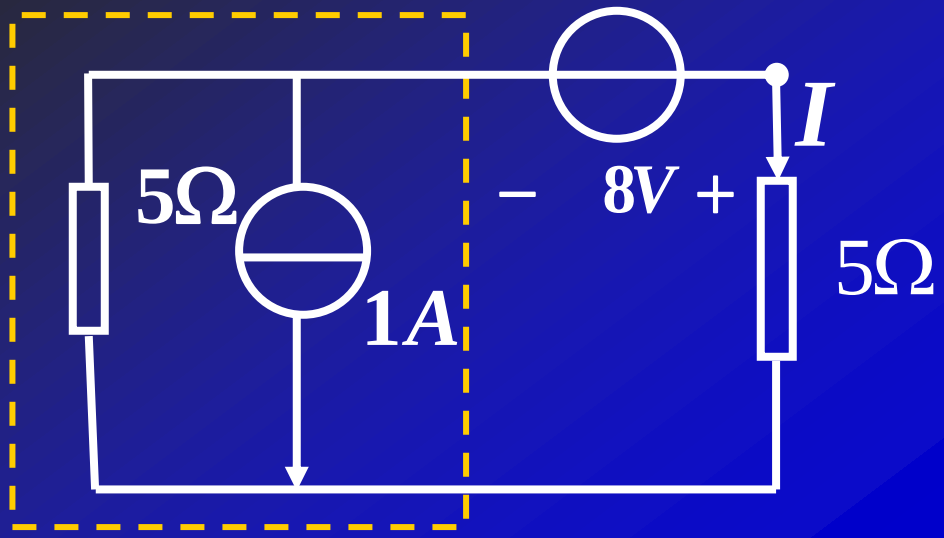

第2步变换



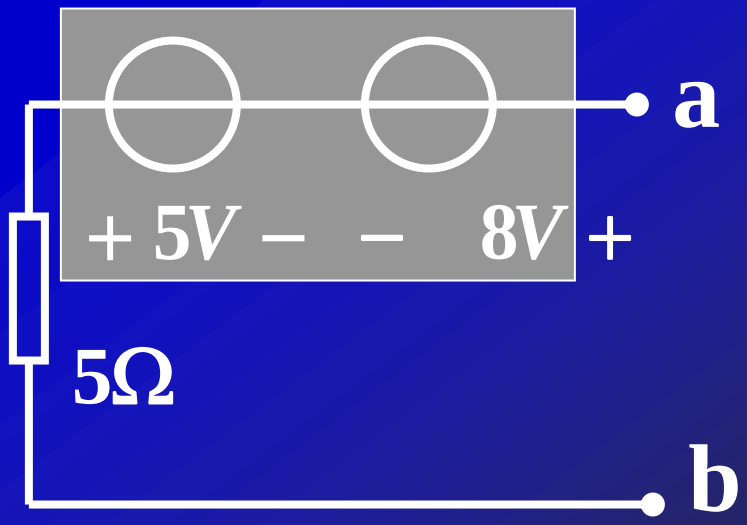


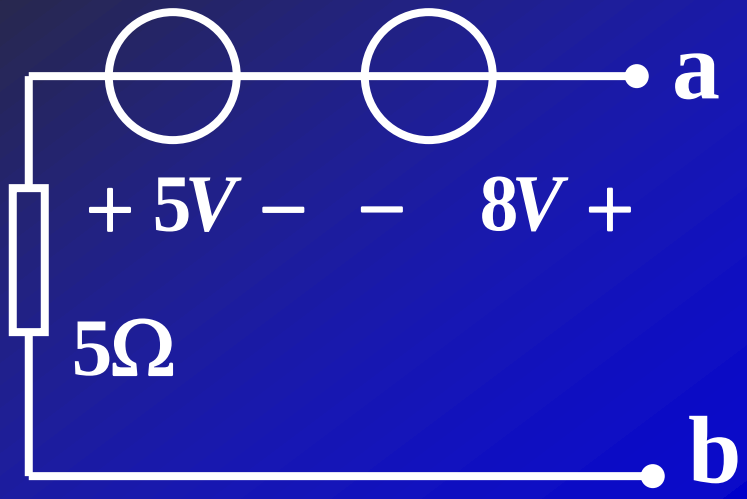

第3步变换



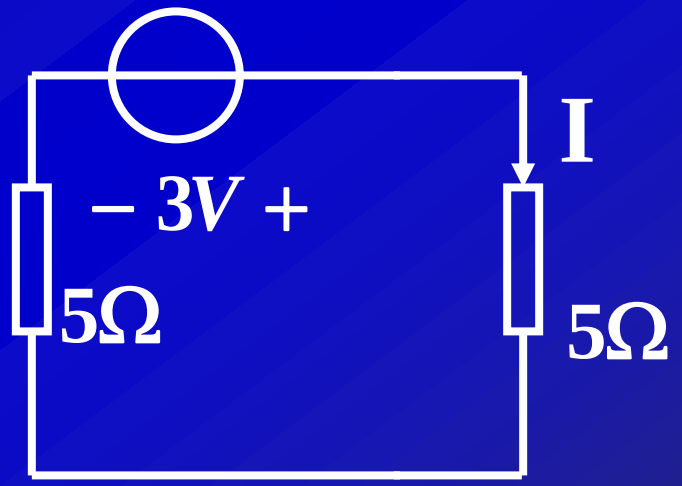



第4步变换






第5步变换




第6步计算

$$I = \frac{3}{5+5} = 0.3A$$