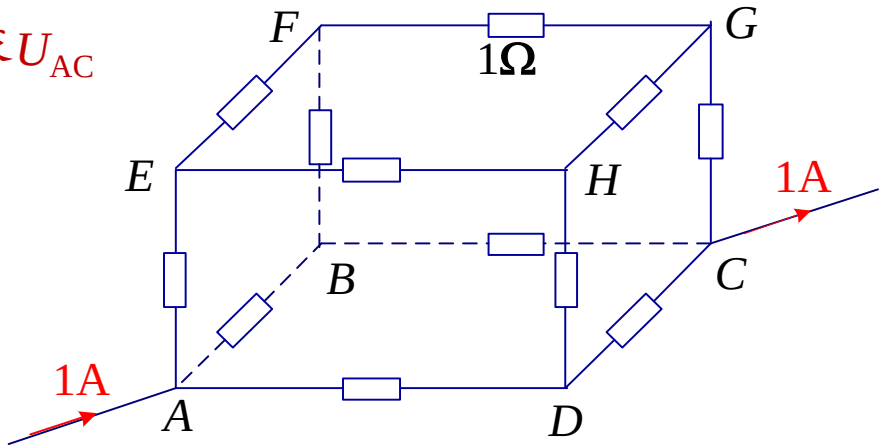
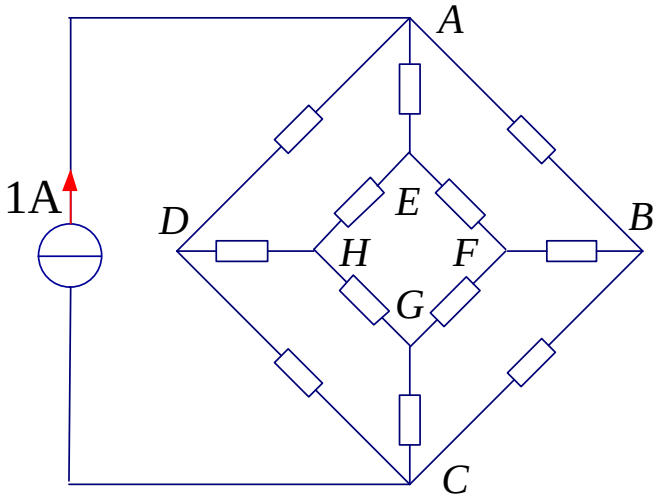
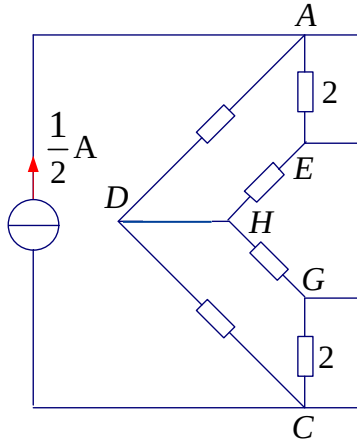
求U_{AC}



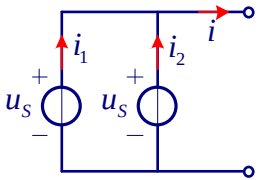


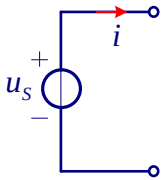


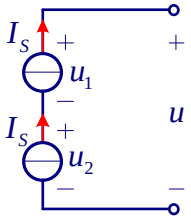
$$R_{AC}=2\times\left(\frac{1\times3}{1+3}\right)=\frac{3}{2}\Omega$$

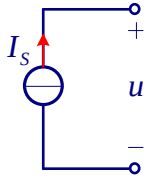
$$U_{AC}=\frac{1}{2}R_{AC}=\frac{3}{4}\mathrm{V}$$

无伴独立电源转移

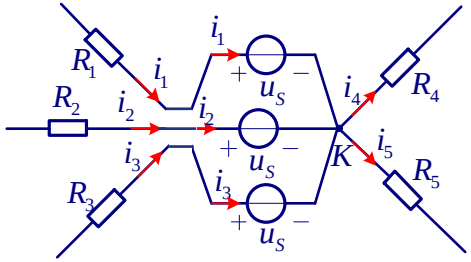


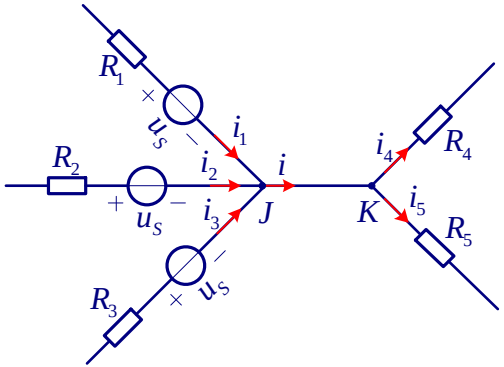


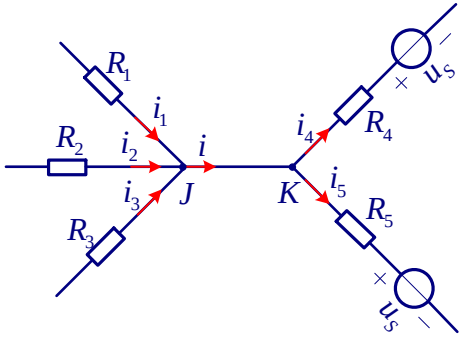




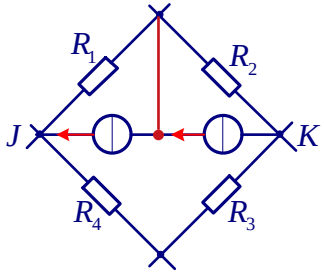
1) 独立电压源转移

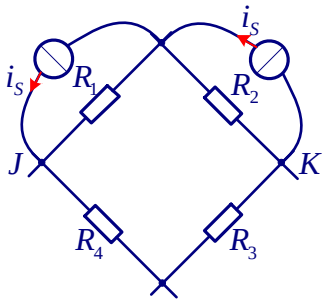


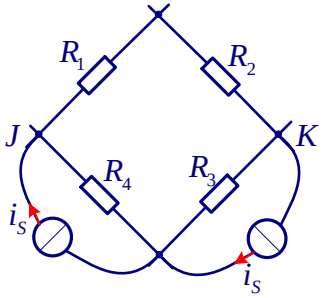




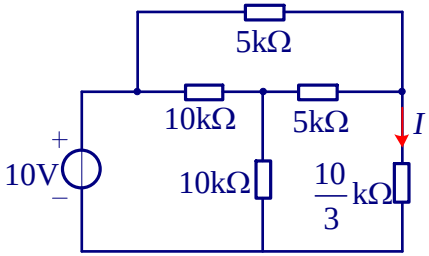
2) 独立电流源转移

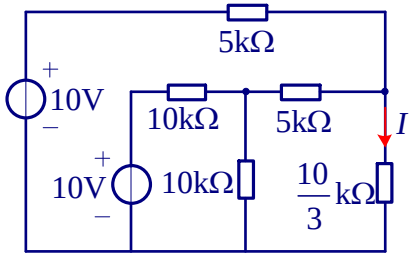


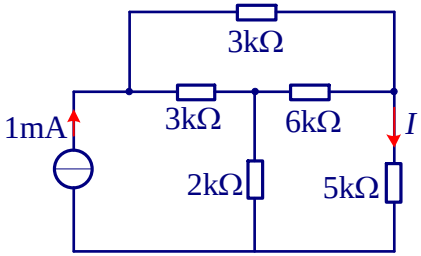


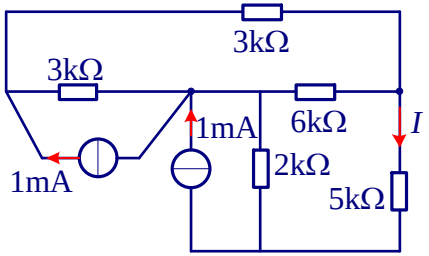


3) 电源转移的应用

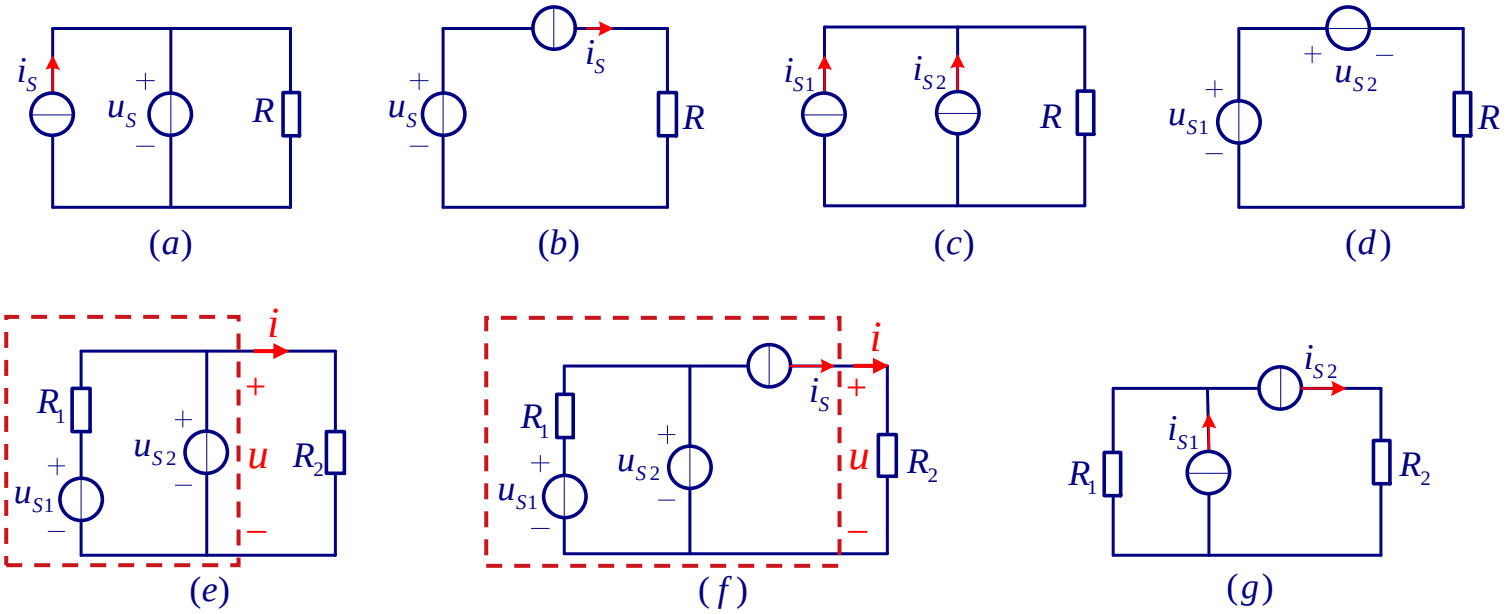




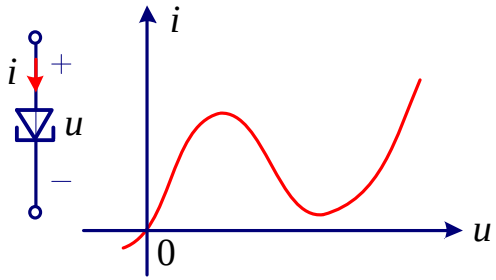


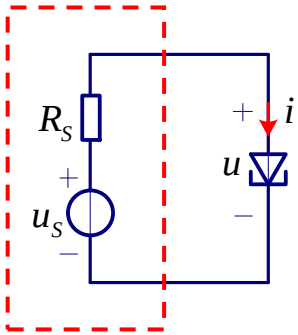


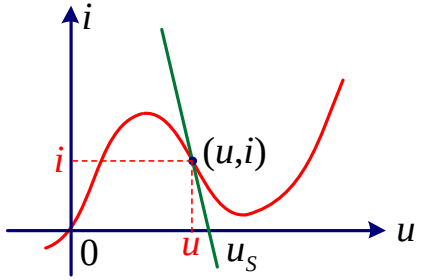
思考：（电源的等效）　　**检验：**端口特性

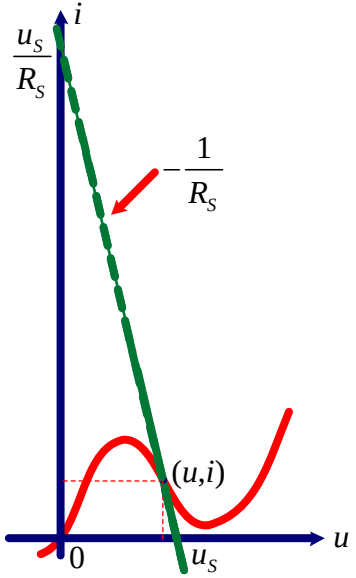


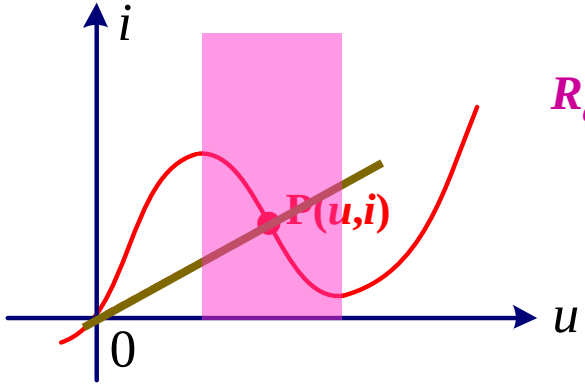
非线性元件之隧道二极管



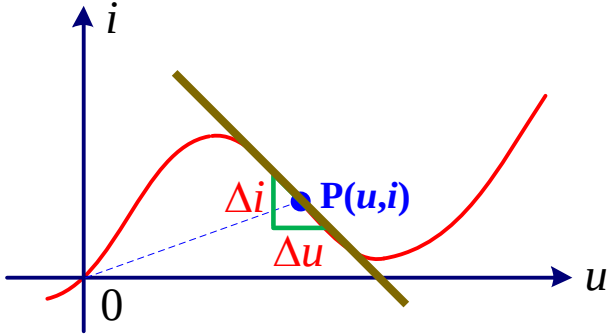






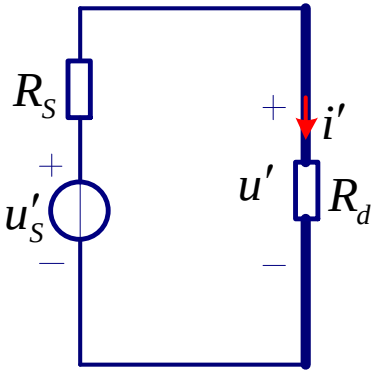


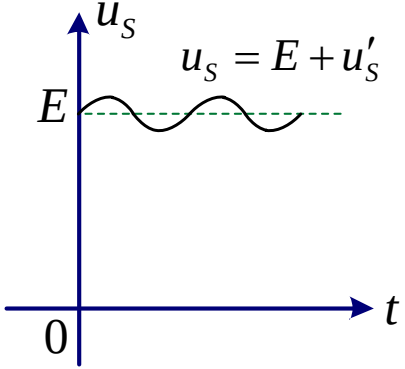
R_d<0, 负阻区

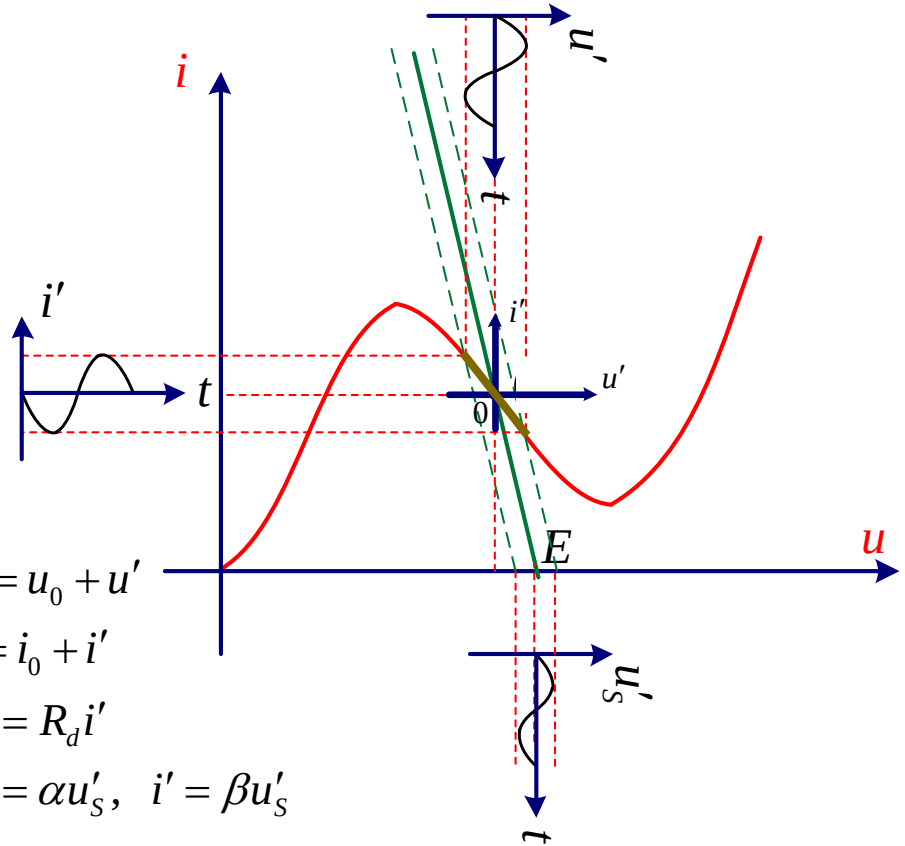


静态电阻 $R=\frac{u}{i}$

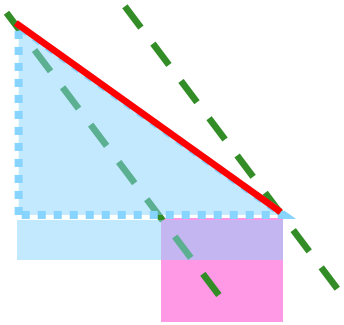
动态电阻 $R_d=\lim\frac{\Delta u}{\Delta i}=\frac{du}{di}$

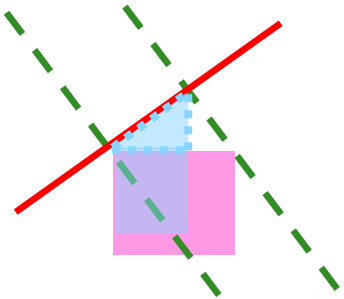


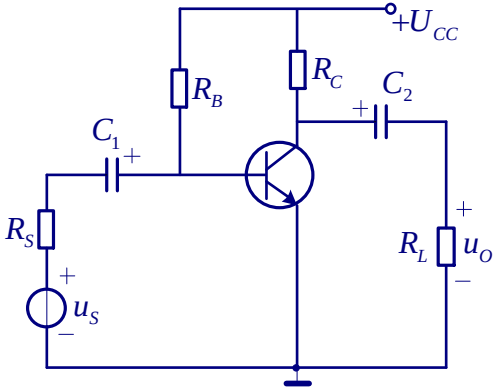




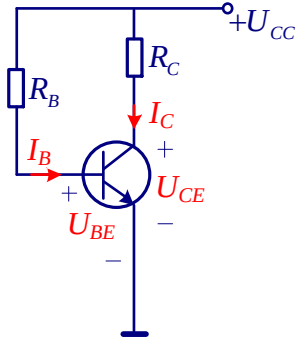
$$u = u_0 + u'$$
$$i = i_0 + i'$$
$$u' = R_d i'$$
$$u' = \alpha u'_S, \quad i' = \beta u'_S$$







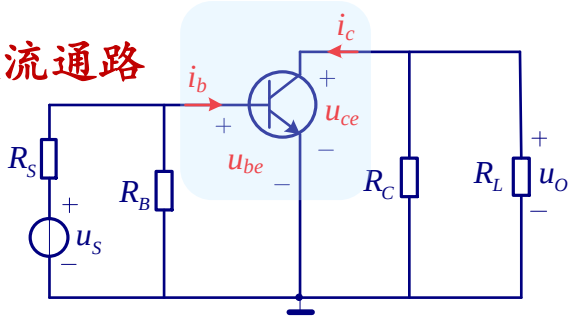
1) 静态工作点



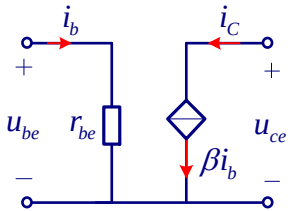
直流通路

2) 交流信号的放大

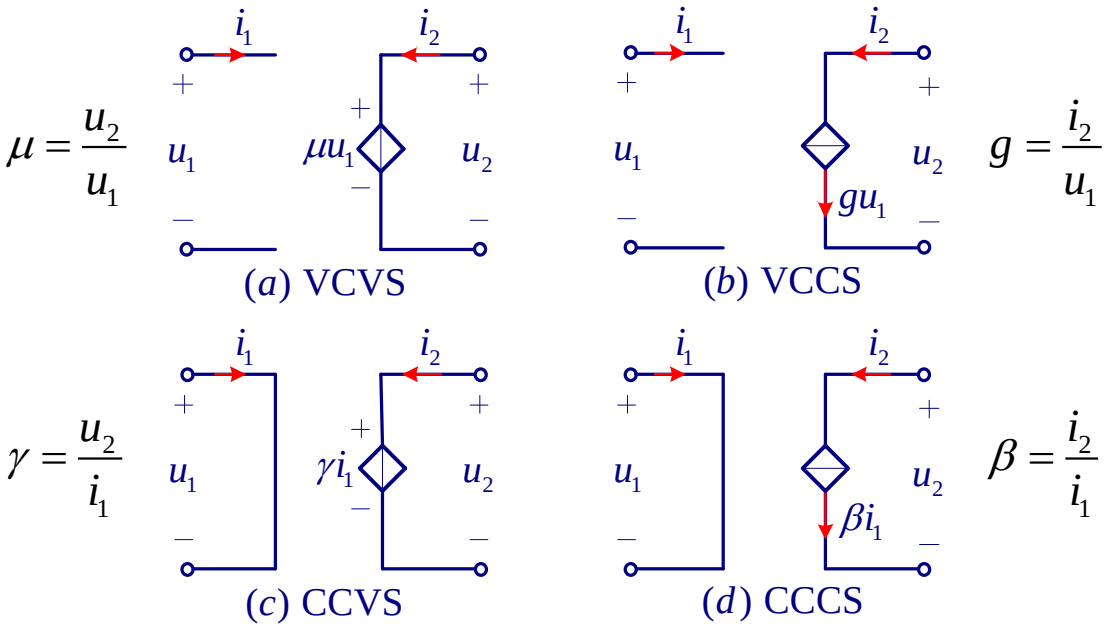
交流通路



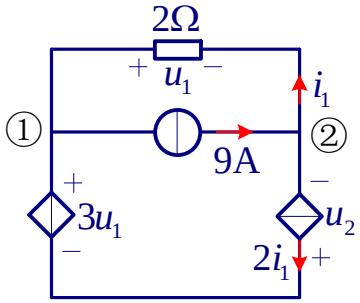
晶体管的微变等效电路



3、受控电源



例： 求两个受控电源各自发出的功率



$i_1 + 2i_1 = 9 \qquad \therefore i_1 = 3\text{A}$

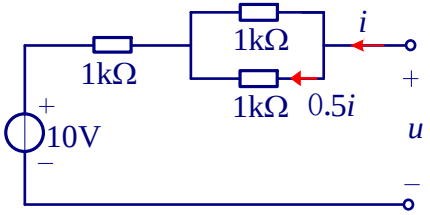
$u_1 = -2i_1 = -6\text{V}$

$\therefore u_2 = u_1 - 3u_1 = 12\text{V}$

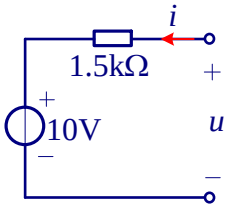
$P_{\text{VCVS}} = 3u_1 \times 2i_1 = -108\text{W}$

$P_{\text{CCCS}} = u_2 \times 2i_1 = 72\text{W}$

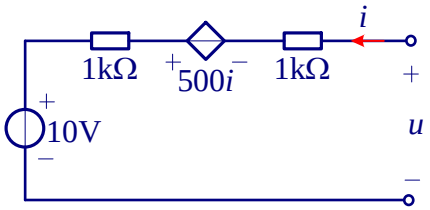
例：求图示电路的最简等效结构

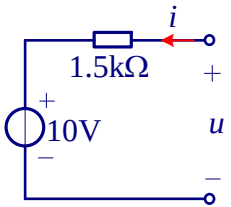


方法一：



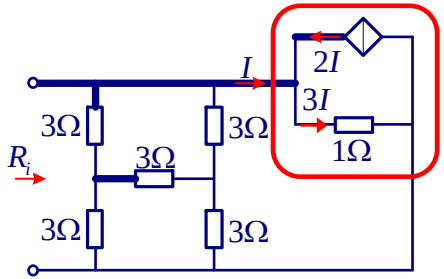
方法二：

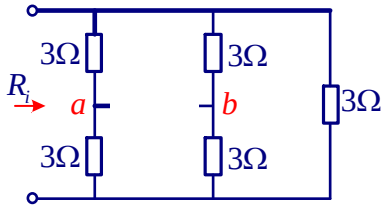




$$u = 2000i - 500i + 10 = 10 + 1500i$$

练习：求输入等效电阻 R_i





$$R_i = \frac{1}{\frac{1}{6}+\frac{1}{6}+\frac{1}{3}} = 1.5\Omega$$