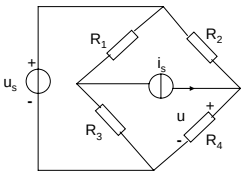
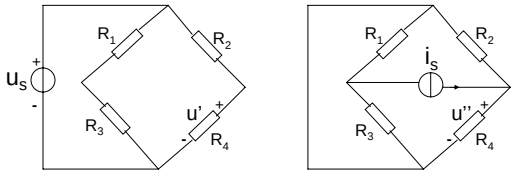
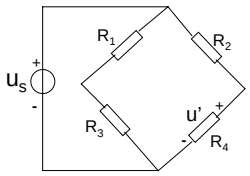
例4-1　求u

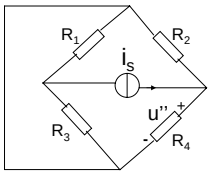


解：



1



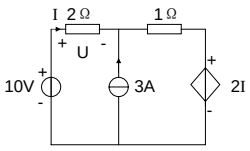


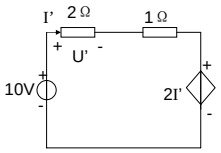
$$u' = \frac{R_4}{R_2 + R_4} u_s \qquad u'' = \frac{R_2 R_4}{R_2 + R_4} i_s$$

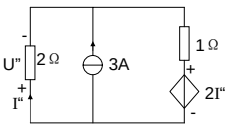
$$u = u' + u''$$

2

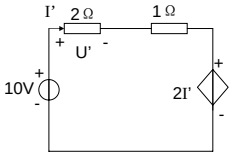
例4-2：用叠加原理求I ，U

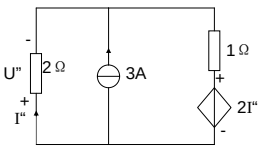






3





$$(2+1)I' = 10 - 2I'$$

$$I' = 2\text{A}$$

$$U' = 2I' = 4\text{V}$$

$$(\frac{1}{2}+1)U'' = -3 - \frac{2I''}{1}$$

$$U'' = 2I''$$

$$U'' = -1.2V$$

$$I'' = -0.6\text{A}$$

4

$$I = I' + I'' = 2 - 0.6 = 1.4\text{A}$$

$$U = U' + U'' = 4 - 1.2 = 2.8V$$

讨论：求2Ω 电阻消耗的功率

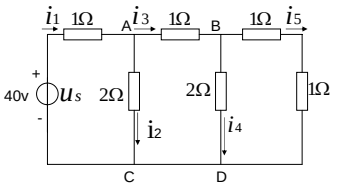
$$P = UI = 2.8 \times 1.4 = 3.92W$$

$$P = (U' + U'')(I' + I'') = U'I' + U'I'' + U''I' + U''I''$$

$$\neq U'I' + U''I''$$

5

例4-3：求各支路电流.



设i'_5=1A

u'_{BD}=(1+1)i'_5=2V

$i'_4 = \frac{u'_{BD}}{2}$=1A

i'_3=i'_4+i'_5=1+1=2A

u'_{AC}=1xi'_3+u'_{BD}=4V

$i'_2 = \frac{u'_{AC}}{2}$=2A

i'_1=i'_2+i'_3=2+2=4A

u'_S=1xi'_1+u'_{AC}=8V

u_S= 40 V

$k = \frac{40}{8} = 5$

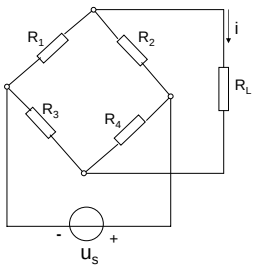
6

$i_1 = k i'_1 = 5 \times 4 = 20$ A

$i_2 = k i'_2 = 5 \times 2 = 10$ A

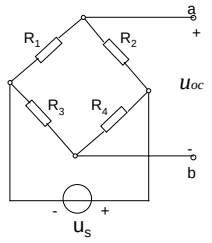
$i_3 = k i'_3 = 5 \times 2 = 10$ A

例4-4：求i



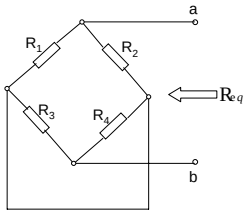
8

解：1. 求 u_{oc}



$$u_{OC} = \frac{R_1}{R_1 + R_2} u_S - \frac{R_3}{R_3 + R_4} u_S$$

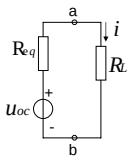
2. 求 R_{eq}



$$R_{eq} = \frac{R_1 R_2}{R_1 + R_2} + \frac{R_3 R_4}{R_3 + R_4}$$

9

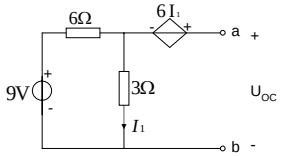
3. 作出戴维南定理等效电路，接上待求支路，求 i



$$i = \frac{u_{oc}}{R_{eq} + R_L}$$

10

例4-5：求如图电路的戴维南等效电路。



解：(1)求 U_{OC}

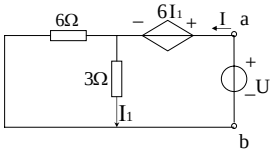
$$I_1 = \frac{9}{6+3} = 1\text{A}$$

$$U_{oc} = 6I_1 + 3I_1 = 9V$$

11

(2)求R_{eq}

解法1：外加电压法

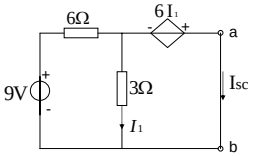


$$U = 6I_1 + 6(I - I_1) = 6I$$

$$R_{eq} = \frac{U}{I} = 6\Omega$$

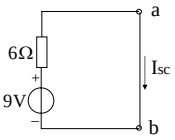
12

解法2：开路－短路法



$$I_1 = \frac{-6I_1}{3} = -2I_1$$

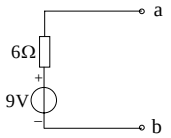
$$I_1 = 0$$



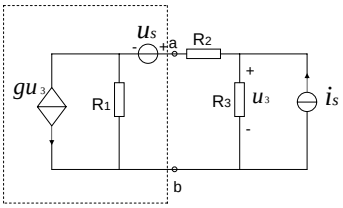
$$I_{sc} = \frac{9}{6}\,A$$

$$R_{eq} = \frac{U_{oc}}{I_{sc}} = \frac{9}{9/6} = 6\Omega$$

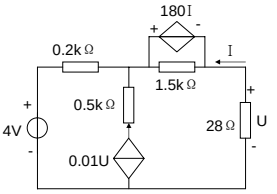
(3)作戴维南等效电路



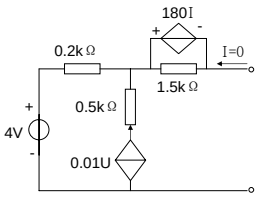
讨论：方框内部分能否用戴维南定理化简？

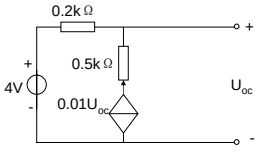


例4-6：用戴维南定理求I



（1）求U_{oc}：

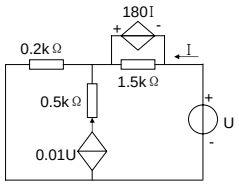




$$U_{oc} = 200 \times 0.01U_{oc} + 4$$

$$U_{oc} = -4V$$

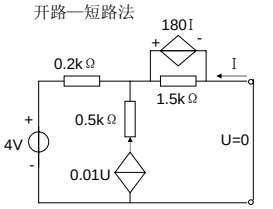
（2）求R_{eq}：外加电压法

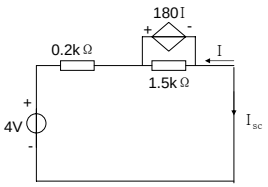


U=−180I+200(I+0.01U)

$$R_{eq} = \frac{U}{I} = -20\Omega$$

开路—短路法





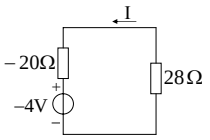
$$180I - 200I - 4 = 0$$

$$I = -\frac{1}{5}\text{A}$$

$$I_{sc} = -I = \frac{1}{5}\text{A}$$

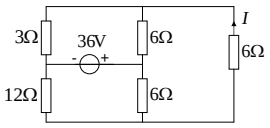
$$R_{eq} = \frac{U_{oc}}{I_{sc}} = \frac{-4}{\frac{1}{5}} = -20\Omega$$

（3）作戴维南等效电路，接上待求支路，求待求量

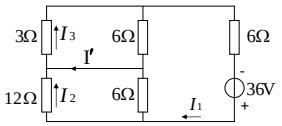


$$I = \frac{4}{28 - 20} = 0.5\text{A}$$

例4-7：求 I



解：



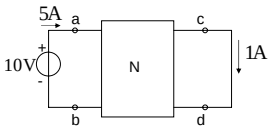
$$I_1 = \frac{36}{6 + \frac{12\times6}{12+6} + \frac{3\times6}{3+6}} = 3\text{A}$$

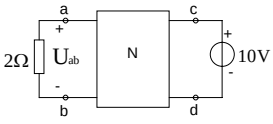
$$I_2 = \frac{6}{12+6}\times3 = 1\text{A}$$

$$I_3 = \frac{6}{3+6}\times3 = 2\text{A}$$

$$I' = I_3 - I_2 = 2 - 1 = 1\text{A}$$

例4-8：N为线性无源纯电阻网络，求U_{ab}

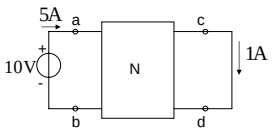


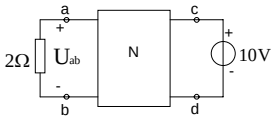


解： 法1

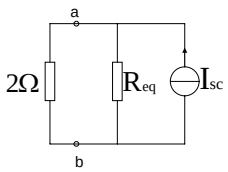
$$10\times\frac{U_{ab}}{2} = -U_{ab}\times5 + 10\times1$$

$$U_{ab} = 1\text{V}$$





法2：



$$R_{eq} = \frac{10}{5} = 2\Omega$$

$$I_{sc} = 1\text{A}$$

$$U_{ab} = \frac{2\times2}{2+2}\times1 = 1\text{V}$$