Dr. Mohamed Bakr, EE2CI5, 2007

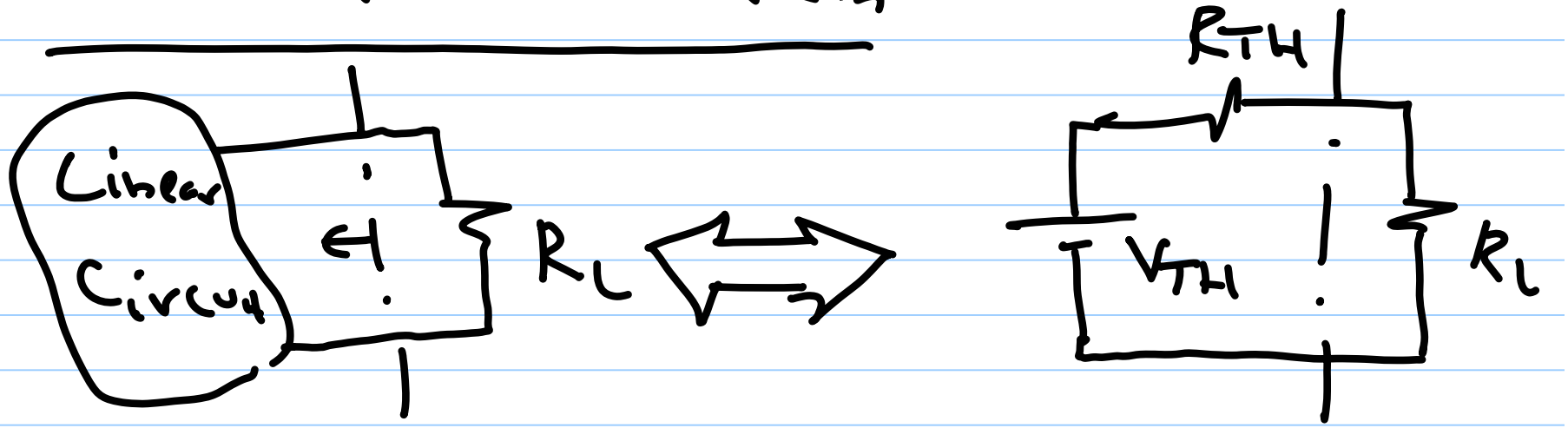
Note Title 10/4/2007

Lecture 12

From section 5.3 of Textbook

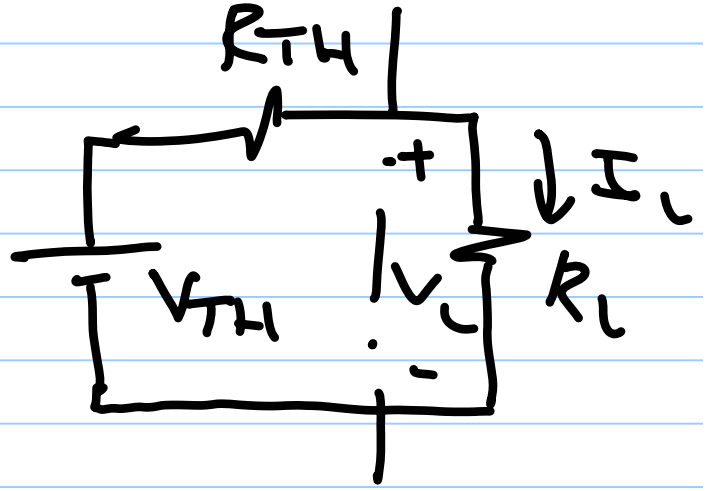
Solve E5.3, E5.4, E5.5, 5.27, 5.32, 5.34, 5.37, 5.39, 5.46, 5.48, 5.5,

Thévenin's Theorem



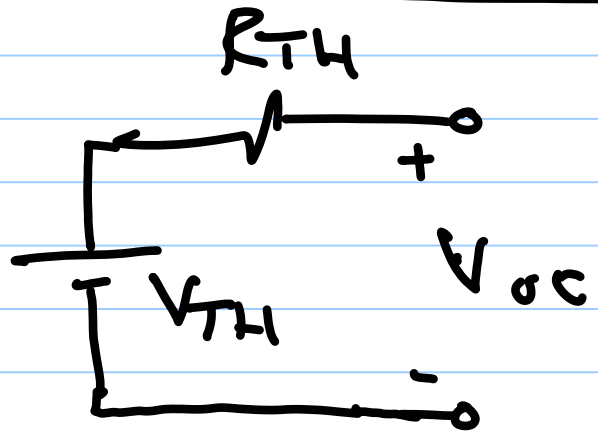
* looking from one side of a plane, any <u>linear</u> circuit can be replaced by a voltage source in series with a resistance

Thévenin's Theorem (Cont'd)



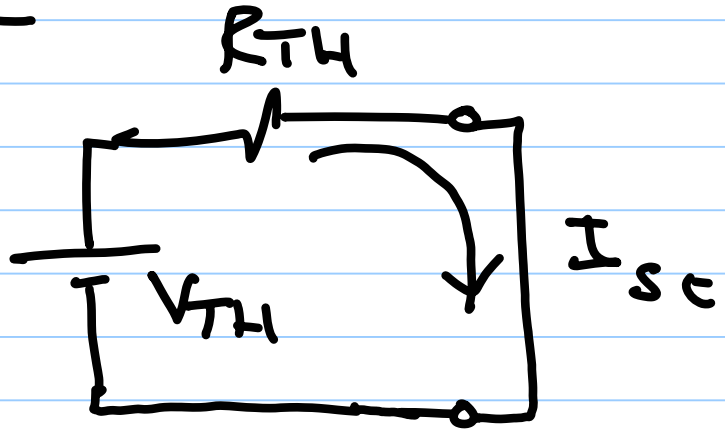
* Once V_{TH} and R_{TH} are determined, we can easily determine I_L and V_L for different load values
* Thévenin's theorem is a direct consequence of linearity

Determining V_{TH} and R_{TH}



1- remove R_L

$V_{TH} = V_{oc}$

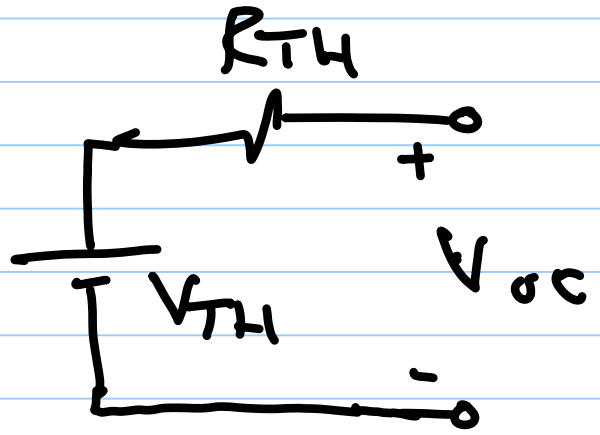


2- short circuit R_L

$$I_{sc} = \frac{V_{TH}}{R_{TH}}$$

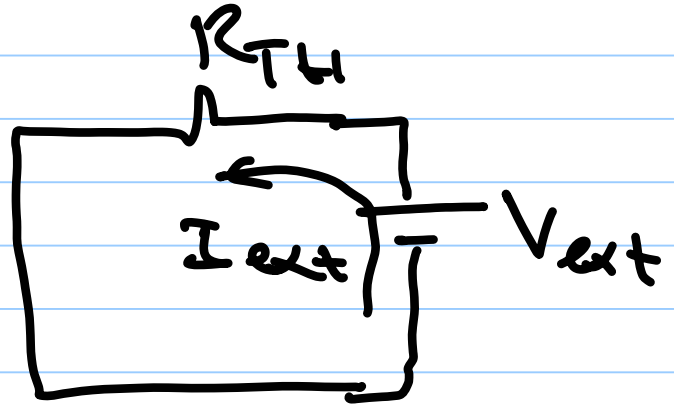
$$R_{TH} = V_{oc}/I_{sc}$$

An Alternative Method



1- Remove R_L

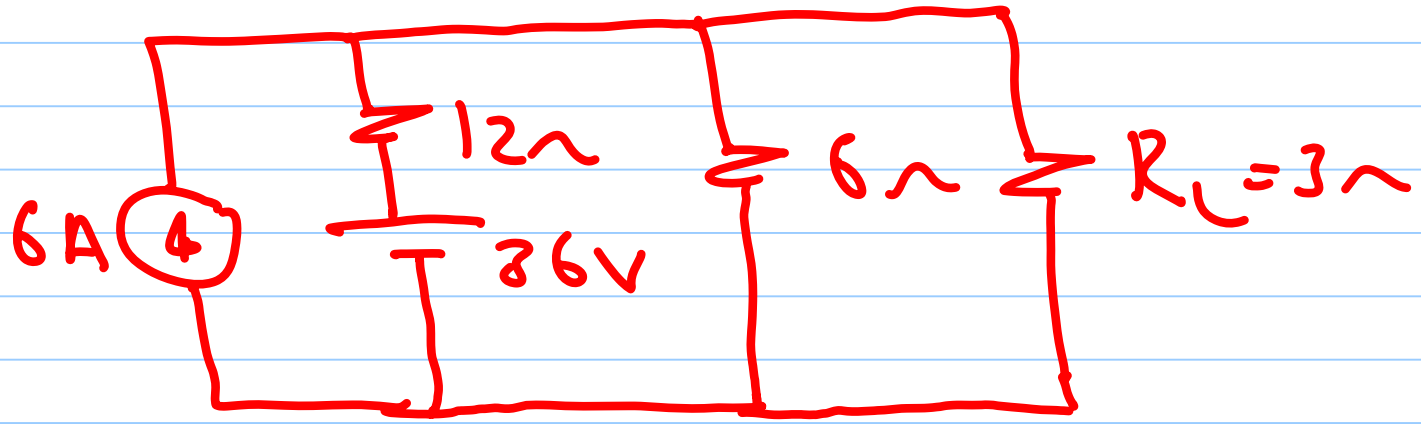
$V_{TH} = V_{oc}$



2- Make $V_{TH} = 0$ by removing all independent sources $\Rightarrow$ $R_{TH} = \frac{V_{ext}}{I_{ext}}$

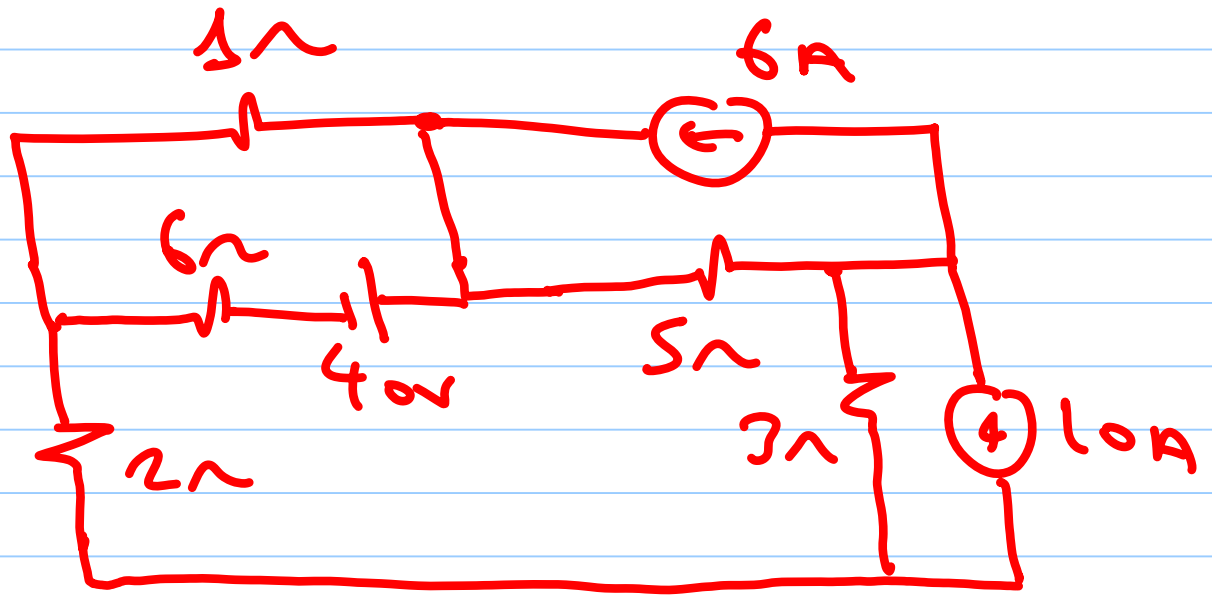
* For Circuits with no independent sources $V_{TH} = 0$

Example



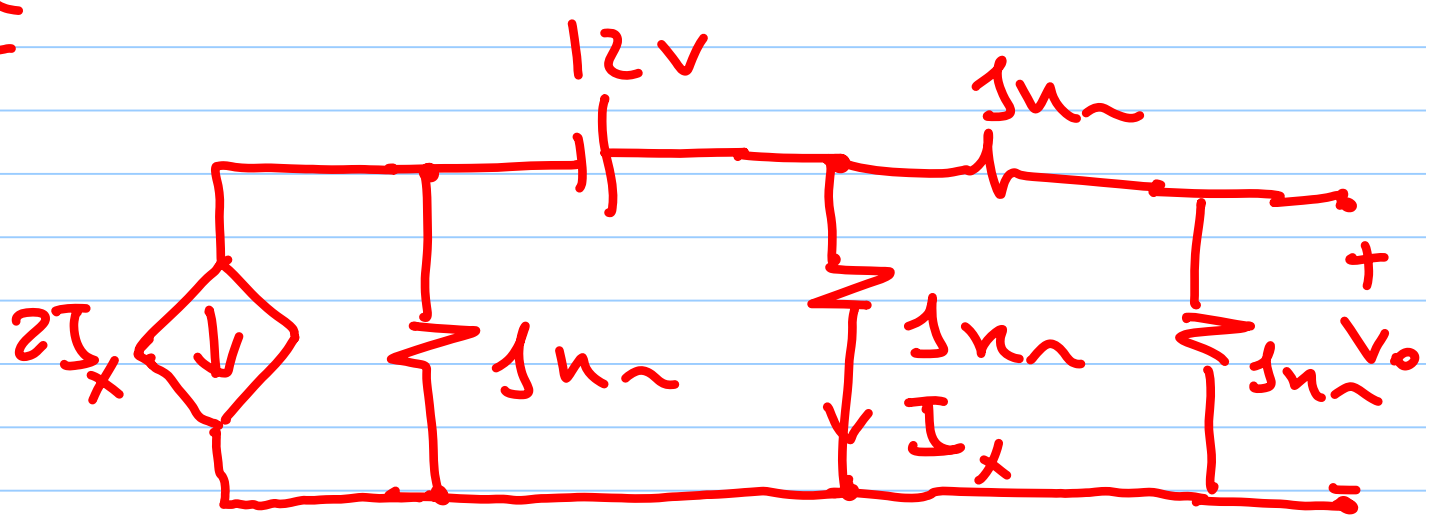
Find the current in the 3Ω resistor using Thévenin's theorem. What is the current if R_L = 10Ω.

Example



Determine the current in the 2Ω resistor using Thevenin's theorem

Example



Use Thevenin's theorem to find V_o