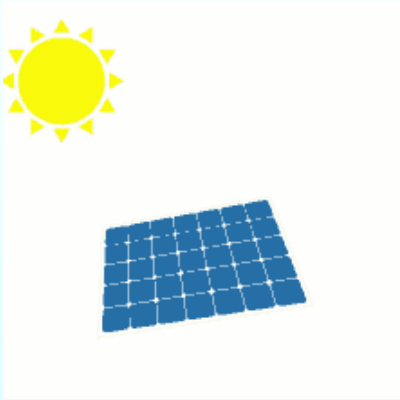
Norton's Theorem



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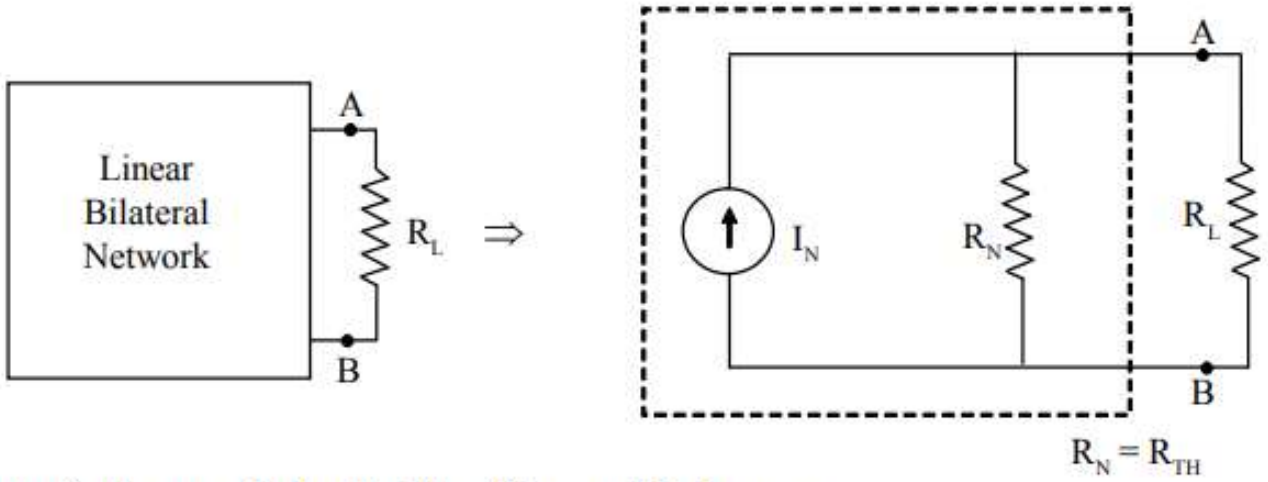
Norton's Theorem



Norton's theorem is the duality of thevenin's theorem.

Statement :

"Any two terminal linear bilateral network having active and passive elements can be represented as a practical current source with I_N and R_N. I_N is the current flowing through the short circuit placed between A and B. R_N is same as R_{TH}. i.e., The resistance measured between A and B by reducing the energy sources to zero".

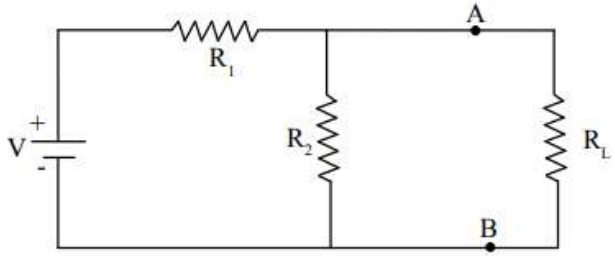
Steps for sovling a network using Norton's Theorem :

1. Replace load resistance (R_L) with a shortcircuit.
2. Calculate current through the short circuit using loop analysis or ohm's law or current division rule.
3. Calculate Norton's resistance looking from A & B.
4. Calculate I_L using current division rule.

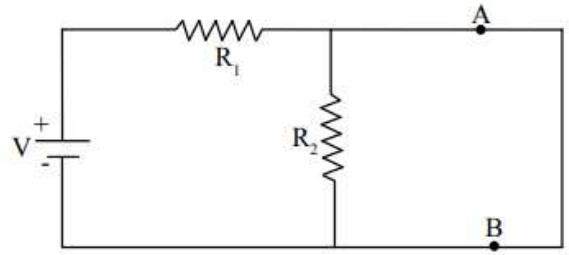
$$I_L = I_N \frac{R_N}{R_N + R_L}$$

Proof :

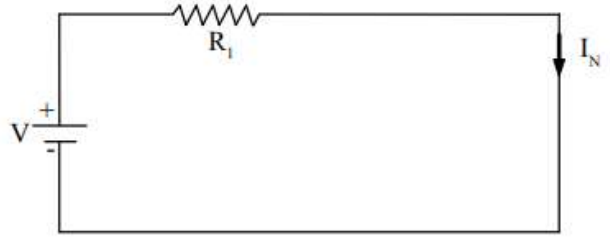
Consider the circuit shown below



1. Replace R_L with a short circuit as in below figure

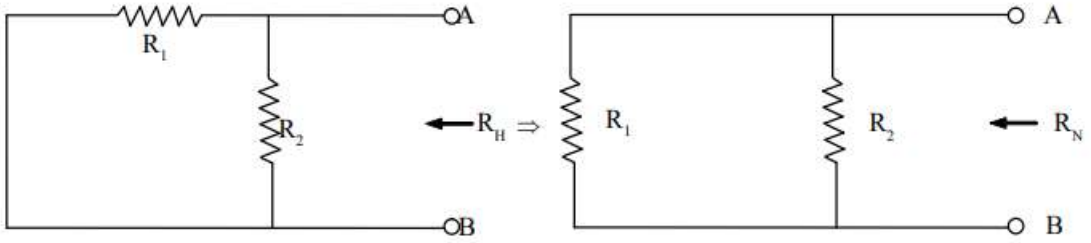


2. Calculate the current I_N.



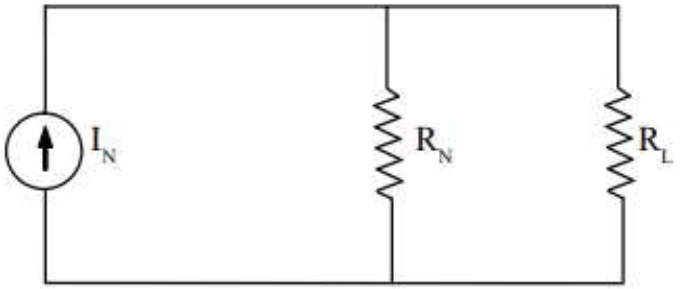
$$I_N = \frac{V}{R_1} \qquad \text{----------(6)}$$

3. Calculate R_N.



$$\therefore\ R_N = \frac{R_1 R_2}{R_1 + R_2} \qquad \text{----------(7)}$$

4. Calculate I_L



$$I_L = I_N \frac{R_N}{R_N + R_L} \qquad \text{----------(8)}$$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Thank You


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