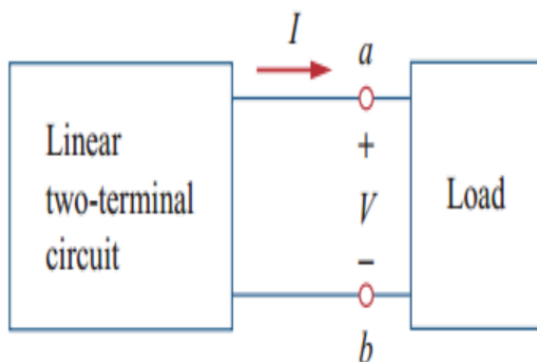


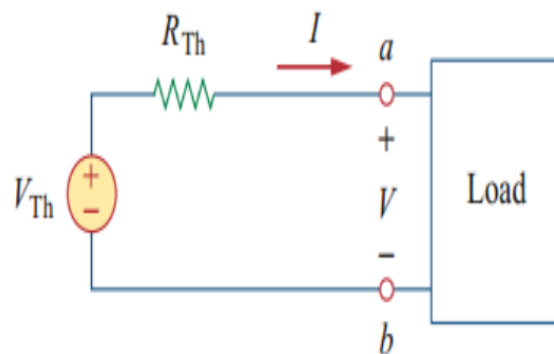
8 - Thevenin

Thevenin's Theorem

Thevenin's theorem states that a linear two-terminal circuit can be replaced by an equivalent circuit consisting of a voltage source V_{Th} in series with a resistor R_{Th} , where V_{Th} is the open-circuit voltage at the terminals and R_{Th} is the input or equivalent resistance at the terminals when the independent sources are turned off.

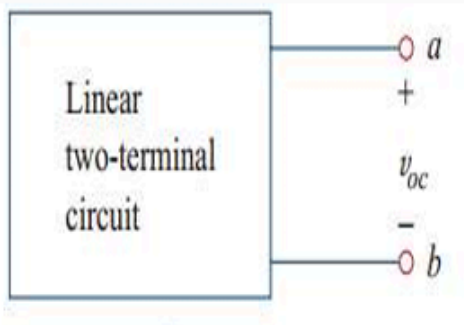


Linear two-terminal circuit

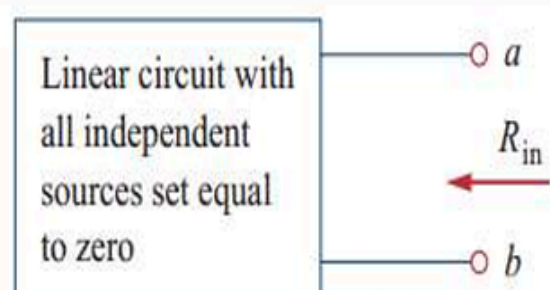


Thevenin equivalent circuit

Two circuits are said to be equivalent if they have the same voltage current relation at their terminals.



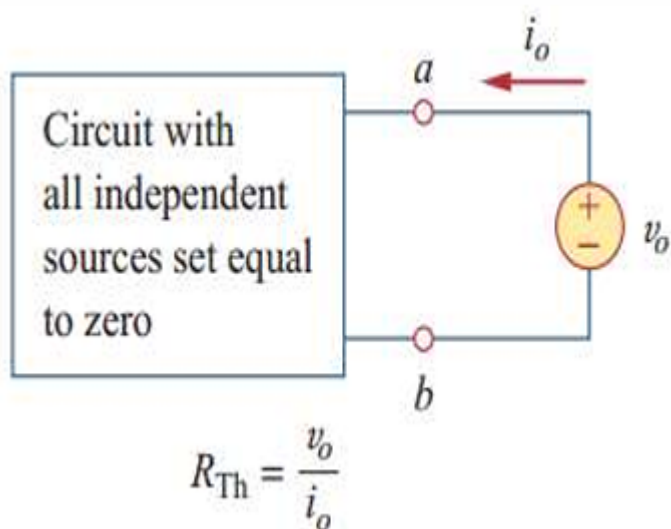
$$V_{Th} = v_{oc}$$



$$R_{Th} = R_{in}$$

If the network has dependent sources, we turn off all independent sources. Dependent sources are not to be turned off because they are controlled by circuit variables. We apply a voltage

source v_o at terminals a and b and determine the resulting current. Then $R_{Th} = \frac{v_o}{i_o}$



Alternatively, we may insert a current source at terminals i_o a-b as shown in following figure and find the terminal voltage. Again then $R_{Th} = \frac{v_o}{i_o}$