THEVENIN'S THEOREM

CIRCUIT ANALYSIS METHOD

prepared by:

Gyro A. Madrona
Electronics Engineer

TOPIC OUTLINE

Thevenin's Theorem

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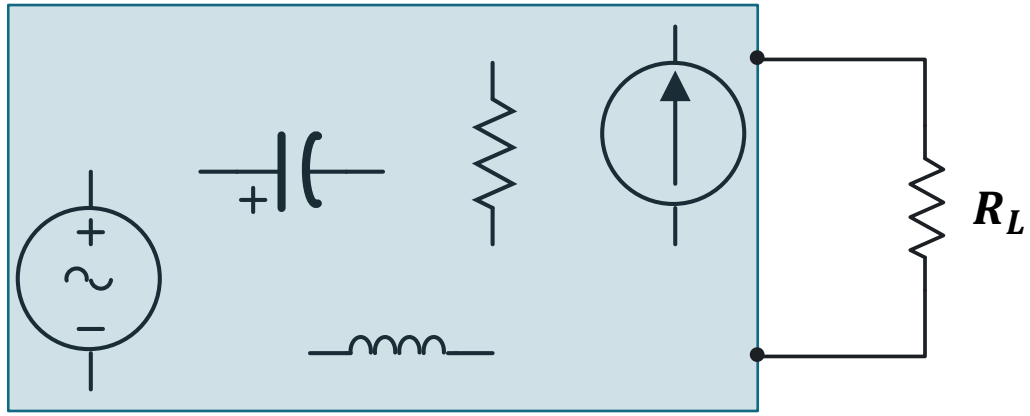
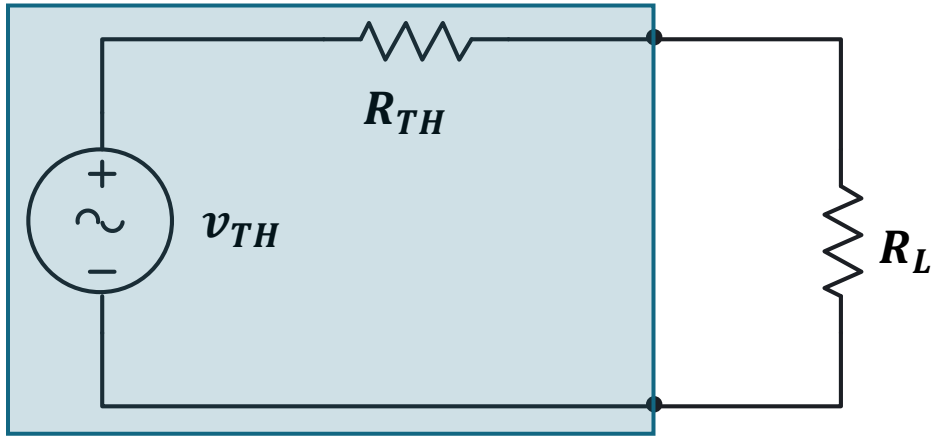
It is possible to simplify any **linear circuit**, irrespective of how complex it is, to an equivalent circuit with a single voltage source, v_{TH} and a series resistance, R_{TH}.

Arbitrary Network:

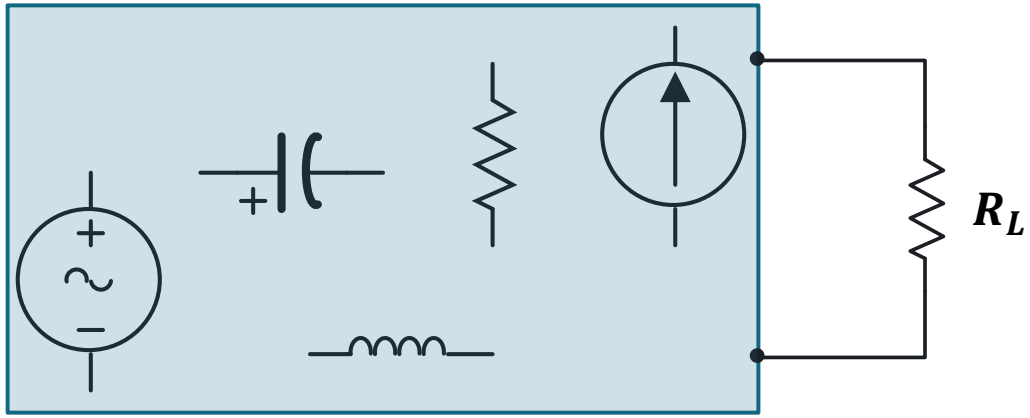


THEVENIN'S THEOREM

Thevenin's Equivalent Circuit:

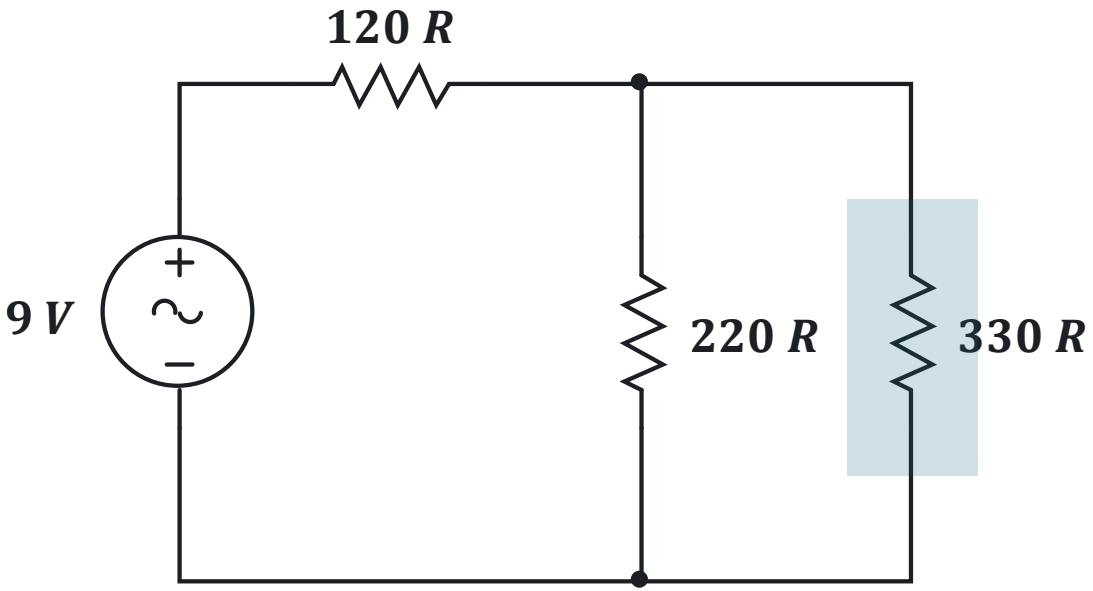


Arbitrary Network:



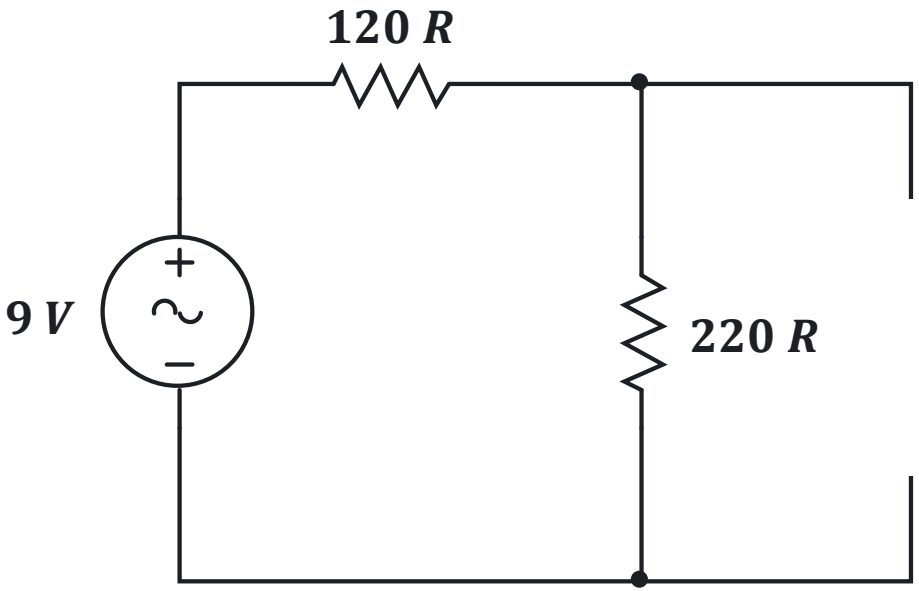
STEPS TO APPLY THEVENIN'S THEOREM

1. Identify the load.



STEPS TO APPLY THEVENIN'S THEOREM

1. Identify the load.
2. Remove the load



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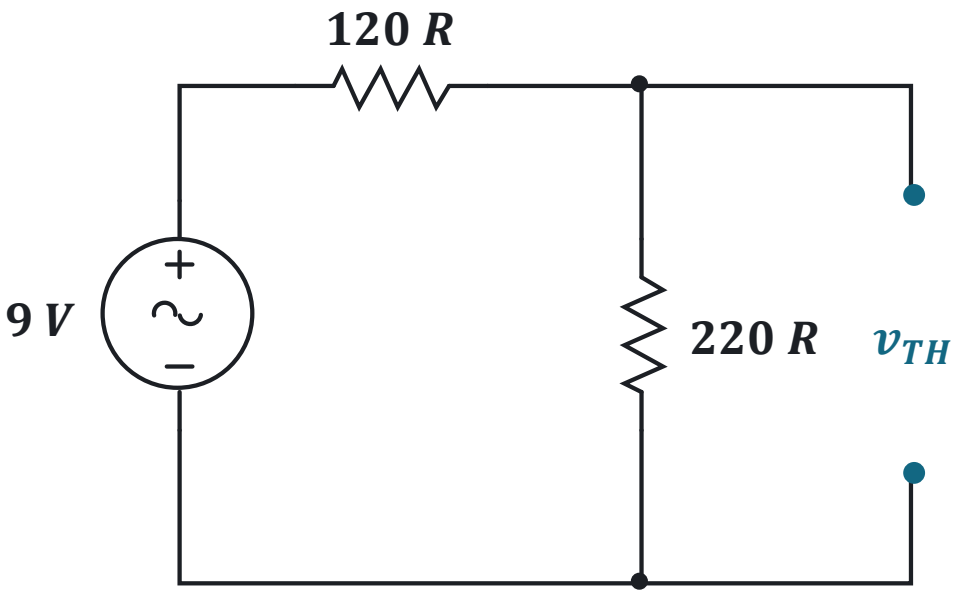
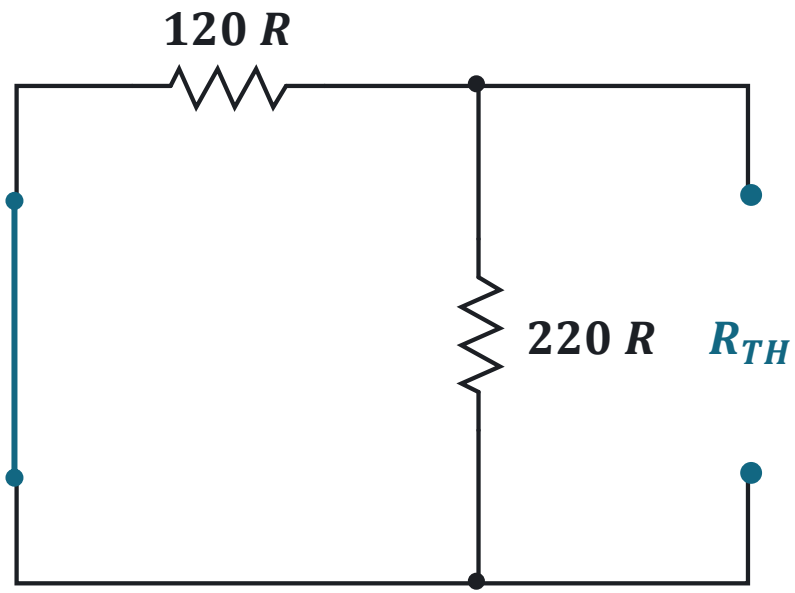


1. Identify the load.
2. Remove the load
3. Determine the Thevenin voltage, v_{th}:

Calculate the **open-circuit voltage** across the terminals where the load was connected.

STEPS TO APPLY THEVENIN'S THEOREM



1. Identify the load.
2. Remove the load
3. Determine the Thevenin voltage, v_{th}:

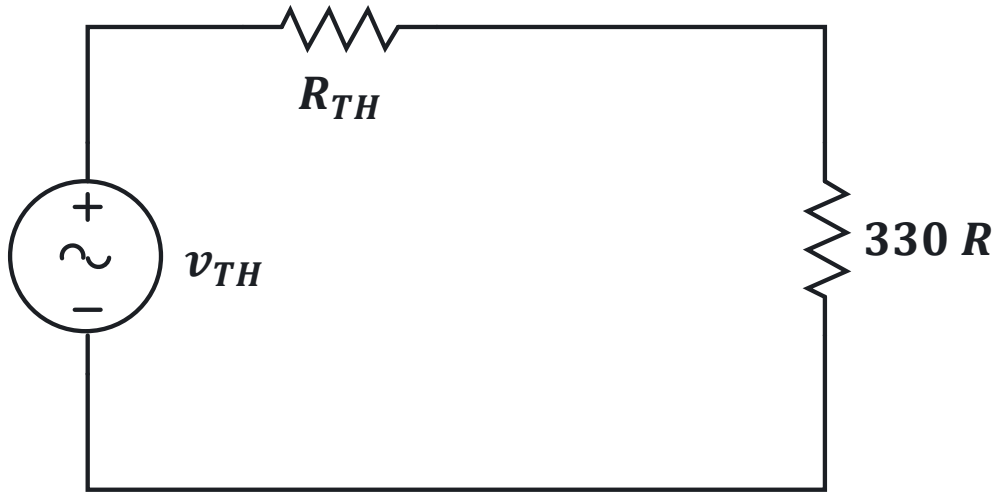
Calculate the **open-circuit voltage** across the terminals where the load was connected.

4. Determine the Thevenin Resistance, R_{TH}:

Set all independent **sources to zero** and calculate the equivalent resistance looking into the terminals where the load was connected.

STEPS TO APPLY THEVENIN'S THEOREM

Thevenin Equivalent Circuit

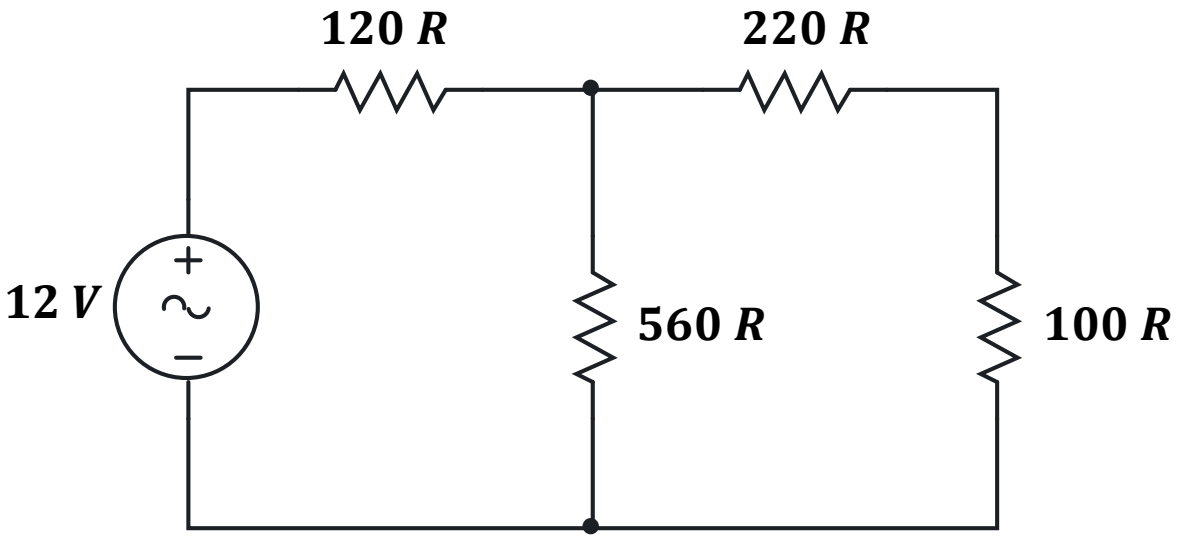


1. Identify the load.
2. Remove the load
3. Determine the Thevenin voltage, v_{th}: Calculate the **open-circuit voltage** across the terminals where the load was connected.
4. Determine the Thevenin Resistance, R_{TH}: Set all independent **sources to zero** and calculate the equivalent resistance looking into the terminals where the load was connected.
5. Replace the original circuit with **Thevenin equivalent** and reconnect the load.

EXERCISE

Determine the load **current**, load **voltage**, and **total power** of the given circuit.

Solution:



LABORATORY