Al-Mustaqbal University
Department of Medical Instrumentation Techniques Engineering
Class: First stage
Subject: Basic Electrical Engineering Lab

Lecturer: Assistant Lecturer:Shahla Yassin ,Ali Ibrahim

Exp.6

Thevenin's Theorems

Theory:

Thevenin is an important principle in electrical engineering that helps simplify the analysis of complex electrical circuits. The principle is based on the idea that any electrical network can be replaced by an equivalent circuit consisting of a single voltage source and a single resistance. Thevenin's principle is widely used in the analysis and design of electrical circuits.

Steps:

1. Determine the source to be switched: We begin by identifying the part of the electrical circuit that we want to simplify using Thevenin's principle.

2. Calculating the Thevenin resistance We disconnect the selected source and calculate the Thevenin resistance given the remaining circuit.
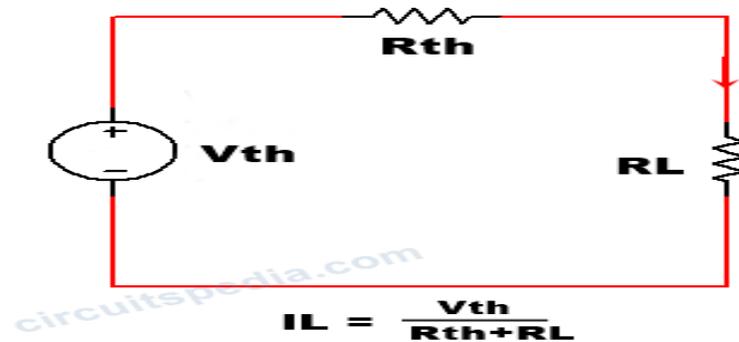


$$IL = \frac{Vth}{Rth+RL}$$

Fig(1)

3. Calculating the Thevenin Voltage We calculate the difference in voltage across the two connection points of the selected source.

$$I_L = \frac{V_{Th}}{R_{Th}+R_L}$$

$$V_L = R_L I_L = \frac{V_{Th}}{R_{Th}+R_L} R_L$$

Using Thevenin's Principle, we can simplify complex electrical circuits into circuits that are more understandable and easy to analyze. This helps save time and effort in designing and analyzing electrical circuits.

Through this experience, we find that Thevenin's principle provides an effective way to simplify and analyze electrical circuits. However, it must be kept in mind that it only applies to linear electrical circuits. There may be cases where Thevenin's principle is not appropriate, such as nonlinear circuits or circuits containing non-stationary elements such as capacitors or coils. Therefore, sound judgment must be used when applying Thevenin's principle to the analysis of electrical circuits.
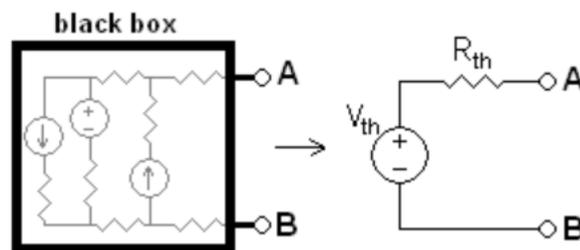
Discussion:

1-What is the purpose of using Thevenin's Law?

2-What are the basic conditions that must be met to use Thevenin's Law?