

THE GEORGE WASHINGTON UNIVERSITY

WASHINGTON, DC

SCHOOL OF ENGINEERING AND APPLIED SCIENCE
DEPARTMENT OF ELECTRICAL AND COMPUTER ENGINEERING
ECE 2110: CIRCUIT THEORY LABORATORY

Tutorial #4:

Using Multisim to Determine Thévenin Equivalent Circuits

INTRODUCTION

Multisim makes finding the Thévenin equivalent of any circuit extremely easy. This tutorial will show you how to use Multisim to quickly find V_{TH} , I_{SC} , and R_{TH} .

INSTRUCTIONS

Notice the example circuit in **Figure 1**. We will be using Multisim to find this circuit's Thévenin equivalent with respect to terminals A and B.

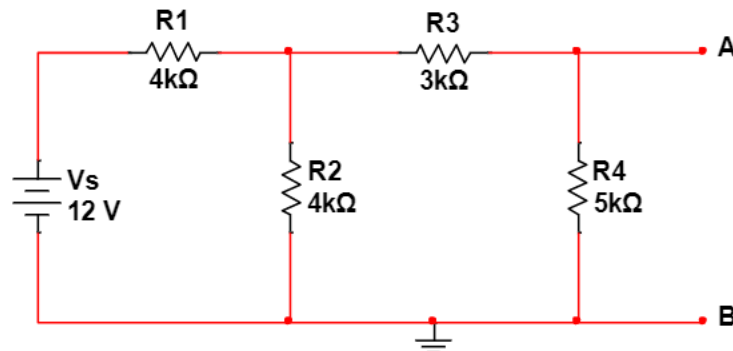


Figure 1 – Example Circuit

Finding V_{TH} and I_{SC}

To find V_{TH} , the voltage between terminals A and B with no load attached, we will simply insert a DMM in Multisim to measure the voltage drop directly as shown in **Figure 2**. The same DMM can also be used to measure I_{SC} , simply by putting it into current mode.

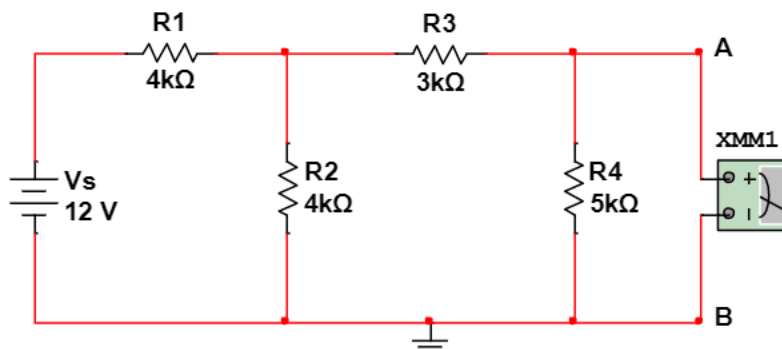


Figure 2 – DMM Placement to Measure V_{TH} and I_{SC}

Next, we will double click on the DMM to bring up its instrument panel as shown in **Figure 3**.

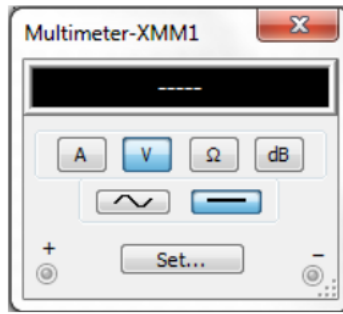


Figure 3 – DMM Placement to Measure V_{TH} and I_{SC}

Then, we will press the run button at the top of the page (green play button) or simply press the **F5** key, to run the simulation. A value should appear on the DMM instrument panel for the voltage. This is V_{TH} . If we switch the DMM into current measuring mode by pressing the **A** on the instrument panel, it will give us the current, I_{SC} . The results for the example circuit are shown below.

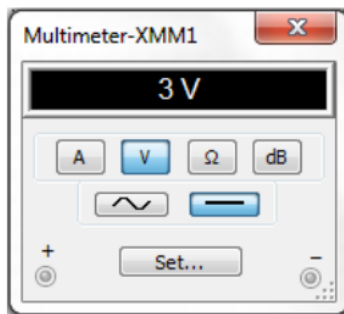


Figure 4 – DMM Showing $V_{TH} = 3V$

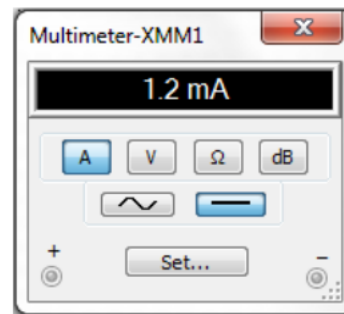


Figure 5 – DMM Showing $I_{SC} = 1.2mA$

Finding R_{TH}

There are multiple ways to find R_{TH} using Multisim, which we will look at in future labs, but for this tutorial, we will simply use **Equation 1** to calculate R_{TH} from the values of V_{TH} and I_{SC} that we found with Multisim.

$$R_{TH} = \frac{V_{TH}}{I_{SC}} = \frac{3V}{1.2mA} = 2.5k\Omega$$

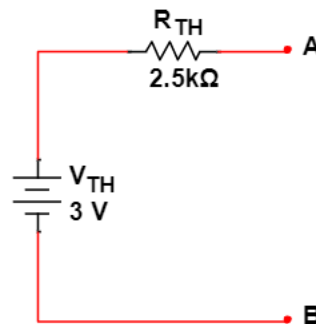


Figure 6 – Thévenin Equivalent Circuit