EET 130

The Wheatstone Bridge and Strain Gauges

Objectives

* Analyze series-parallel DC circuits
* Build and take measurements in series-parallel DC Circuits
* Use innovative and critical thinking to analyze a problem.

Recall from series-parallel circuits: the Wheatstone Bridge



How can we redraw the circuit to facilitate analysis?

Using your redrawn circuit and the following values, compute the voltage between points A and B.

VS=12V

R1= 220Ω

R2=100Ω

Rx= 3.3kΩ

Rs=2.2kΩ

VAB= \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Is this bridge balanced? \_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_\_

Notice the symbol for RS. Recall that this symbol means a variable resistor, such as a potentiometer. By adjusting the value of RS, we can “balance” the bridge.

How do we determine the value of RS that will balance the bridge?

 **Application**

One application for the Wheatstone Bridge is a *strain gauge circuit*, used for p*recision weighing or structural monitoring*. In the typical strain gauge circuit, a *foil strain gauge* takes the place of one of the resistors. The *resistance of the foil strain gauge changes as is it stretched or compressed*. If we know the strain gauge characteristics, we can determine the amount of stretch or compression of the material or structure we’re measuring. We will discuss foil strain gauges and a new type of elastomer strain gauge in class.