

## % Error & % Difference Explained

Often, laboratory experiments are designed to determine the value of well-known physical quantities such as the value of  $p$  or the acceleration due to earth's gravity,  $g$ . Since these quantities have **accepted or true values**, we can calculate the **percent error** between our measurement of the value and the accepted value with the formula

$$\text{Percent Error} = \frac{| \text{measured} - \text{actual} |}{\text{actual}} * 100\%$$

Sometimes, we will compare the results of two measurements of the same quantity. For instance, we may use two different methods to determine the speed of a rolling body. In this case, since there is **not** one accepted value for the speed of a rolling body, we will use the **percent difference** to determine the similarity of the measurements. This is found by dividing the absolute difference of the two measured values by their average, or

$$\text{Percent Difference} = \frac{| \text{measured}_1 - \text{measured}_2 |}{\left( \frac{\text{measured}_1 + \text{measured}_2}{2} \right)} * 100\%$$

With a series (set) of “trial measurements” within a single “run,” one would list the trial measures in ascending order, and the percent difference between the lowest and highest is:

$$\text{Percent Difference} = \frac{\text{Max} - \text{Min}}{\text{Set Average}} \times 100$$

Retrieved and adapted from <<http://phoenix.phys.clemson.edu/tutorials/error/index.html>> on 2/5/2008.