Uncertainty

Mr. van Bemmel
Marc Garneau C.I. Physics Department
Transcribed by Eric Ye

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1 Basic Definitions

1.1 Precision

The repeatability of a measurement.

1.2 Accuracy or Error

The error is the difference between the true value and a measurement. We almost never know the true value. Accuracy is a characterization of the error. When accuracy increases, error decreases.

1.3 Reading Error

This is an estimate by the user perhaps based on information from the manufacturer of an instrument of precision that is typical for this instrument when used in an approved manner to its maximum capability. This is used to:

$$\sigma_x = \sqrt{\frac{\sum_{k=1}^{n} (\bar{x} - x_k)^2}{n - 1}} \tag{1}$$