Means and variances of data

The arithmetic mean of a sample (sample mean) of a measurand represented by random variable X is defined as

If the sample size is large, $\bar{x} \to m_X$ (the sample mean approaches the "true mean" or population mean). The population mean (or mean) can be expressed as

Recall that we defined the mean as $m_X \equiv \langle X \rangle$.

The sample variance of a measurand represented by r.v. X is defined as

If the sample size is large, $s_X^2 \to \sigma_X^2$ (the sample variance approaches the "true variance" or population variance). The population variance can be expressed as

Recall that we defined the variance as $\sigma_X^2 = \langle (x - m_X)^2 \rangle$.