Standard deviation of the means (SDOM)

Consider a sample of N measurands. From its sample mean $\bar{x}$ and sample standard deviation s_x, a precision interval can be determined within which we expect the true mean m_X of the population lies with confidence $P\%$.

Although we will find that we don't need them in the end, for now we introduce M samples, each with N measurands. The i^{th} measurand from the j^{th} sample is denoted x_{ij}.

Each $\bar{x}_j$ is a r.v., and the central limit theorem implies that $\bar{x}_j$ will be normally distributed about their mean

The standard deviation of the means (SDOM) is

It can be shown from (*) and (**) that

Now we can compute a precision interval in which we expect the true mean m_X with confidence $P\%$:

Example What is the SDOM of n.v. X that has a sample

x_1	x_2	x_3	x_4	x_5	x_6	x_7	x_8	x_9
2.1	2.4	1.7	2.0	1.9	2.2	1.6	1.9	2.3

.

Also, what is the precision interval of the true mean m_X with confidence 95% ?