So, given x_i, i=1…N, we can compute

$$\overline{x} = \frac{1}{N}\sum_{i=1}^{N} x_i \quad \pm \quad \sigma_{\overline{x}} = \frac{s}{\sqrt{N}}$$

the sample mean

$$s = \sqrt{\frac{1}{N-1}\sum_{i=1}^{N}(x_i - \overline{x})^2} \quad \pm \quad \sigma_s = \frac{s}{\sqrt{2(N-1)}}$$

the sample standard deviation

What exactly did we compute?

In the majority of practical cases, x_i represent our N measurements of some fixed well-defined quantity x, and our inference about its value is summarized by the sample mean and the standard error of the mean, and assumed Gaussian distribution.

What about standard deviation?