So, given x_i, i=1…N, we can compute

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

the sample standard deviation

What about standard deviation?

There are two limiting, but often realistic, cases in practice:

1) Our measurements have some fixed (a priori unknown) measurement error σ, and (s, σ_s) summarizes our knowledge of it

2) We measured quantity x which has its own intrinsic scatter σ (e.g. weight of a loaf of bread), and (s, σ_s) summarizes our knowledge of it (assuming here that the measurement error is negligible compared to σ).