

IMPROVING ON THE RANGE RULE OF THUMB

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Abstract. In manufacturing it is useful to have a quick estimate of the standard deviation. This is often done with the range rule of thumb:

$$\sigma \approx \frac{\text{sample range}}{4}.$$

This rule works well when the data comes from a normal distribution *and* the sample size is around 30, but fails miserably for other distributions and sample sizes. Through the use of Monte Carlo simulations we suggest new rules of thumb for the normal distribution ($\sigma \approx \frac{\text{range}}{(3\sqrt{\ln n - 1.5})}$), uniform distribution ($\sigma \approx \frac{n+1}{n-1} \cdot \frac{\text{range}}{\sqrt{12}}$) and exponential distribution ($\sigma \approx \frac{\text{range}}{\ln(n)+4/9}$) which are dependent on sample size. We then seek to verify these empirical results theoretically.

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