

Section 6.4: Choosing the Sample Size

Tuesday, March 6, 2018 4:08 PM

- precision of your estimate is measured by the margin of error (or, equivalently, by the width of the confidence interval)

∴ when designing your sampling plan, choose sample size to ensure that you get the precision you want/need

example:

suppose you wish to estimate the mean time between failures for a certain brand of disk drive. From previous experience, you know that σ is in the neighbourhood of 200 hours. If you want your estimate of the mean to be precise (with 99% confidence) to within ± 50 hours of the true value, how many disk drives will you have to test?

$$\text{MOE} \leq B \quad \leftarrow \text{bound} = 50$$

$$z_{\alpha/2} \text{SE} \leq B$$

$$z_{\alpha/2} \frac{\sigma}{\sqrt{n}} \leq B$$

$$z_{\alpha/2} \frac{\sigma}{B} \leq \sqrt{n}$$

$$\left(z_{\alpha/2} \frac{\sigma}{B} \right)^2 \leq n$$

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$$n \geq \left(\frac{2.576 \cdot 200}{50} \right)^2$$

$$\geq 106.172$$

$$\geq 107 \quad (\text{I'd say } 110)$$

ROUND
UP