# Interval Estimation

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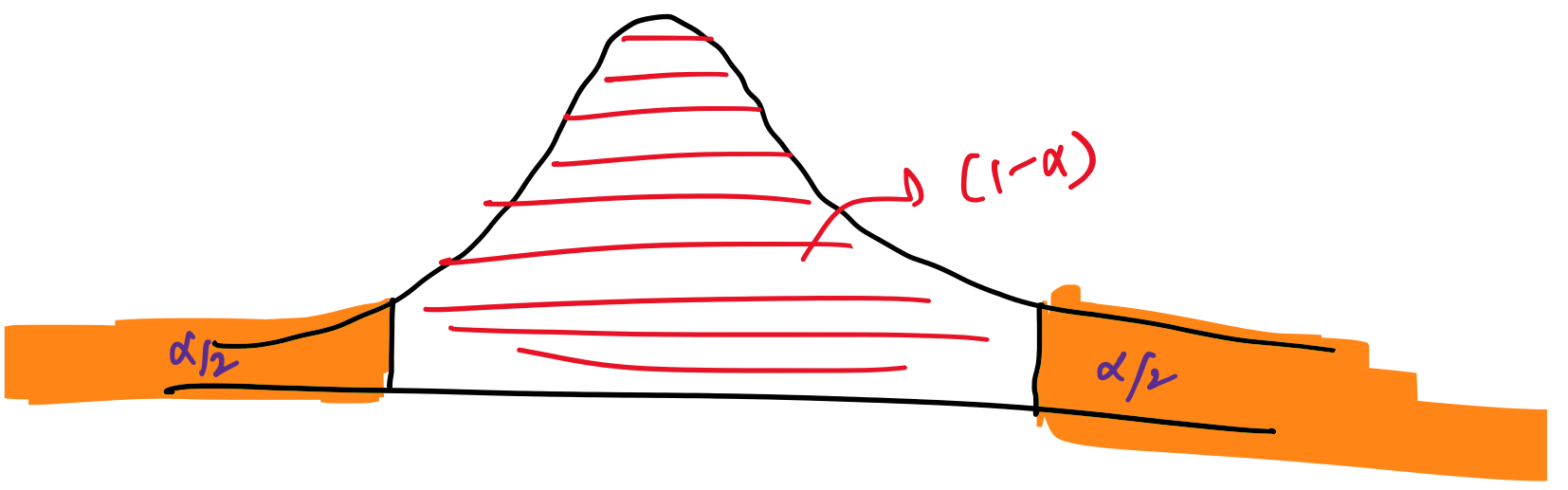
- Given a population parameter $\theta$, we will find an interval $(\hat{\theta}_L \ \hat{\theta})$ such that $\theta \in [\hat{\theta}_L \ \hat{\theta}_U]$ with some level of confidence.

For example:-

- If we are 95% confident that $\mu \in [2, 7]$ for some given population, then $(2, 7)$ is our 95% confidence interval.

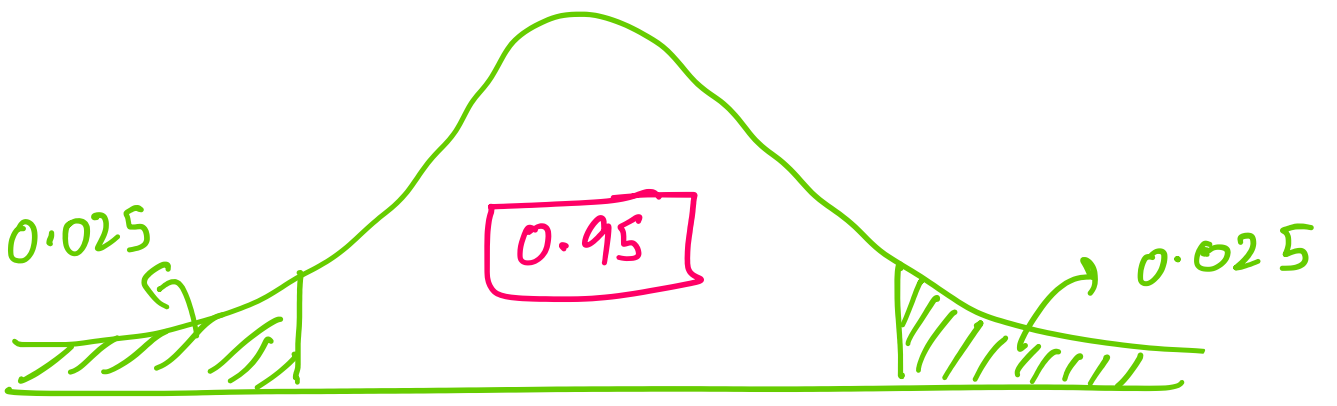
- We are given $\alpha \rightarrow$ a level confidence

then our confidence interval will be constructed by removing $\alpha$ area from pdf graph as follows:-




Here we are $(1-\alpha)100\%$ confident.

- If $\alpha = 0.05$, our confidence interval could be 95%.




- If $\alpha = 0.01$, our confidence interval would be 99%.


Note • If the interval $[\hat{\theta}_L \ \hat{\theta}_U]$ is large, our accuracy of estimation is less. When the interval is smaller, the estimatin is better.

- Of course, it is better to be 95% confident that the average life of a certain television transmitter is between 6 and 7 years than to be 99% confident that it is between 3 to 10 years.

- Ideally we prefer a short interval with a high degree of confidence.