μ $\bar{x}$ $\boxed{\mathbb{E}[\cdot]}$

Population mean

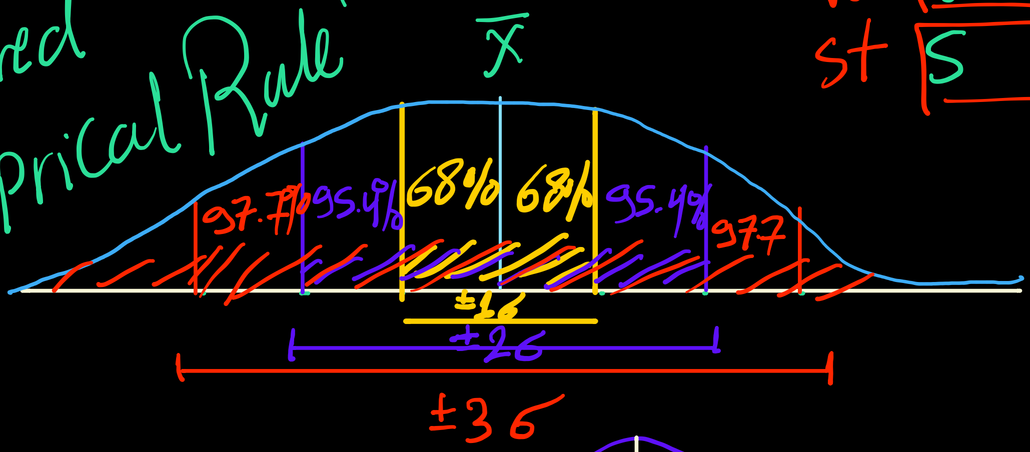
Sample mean

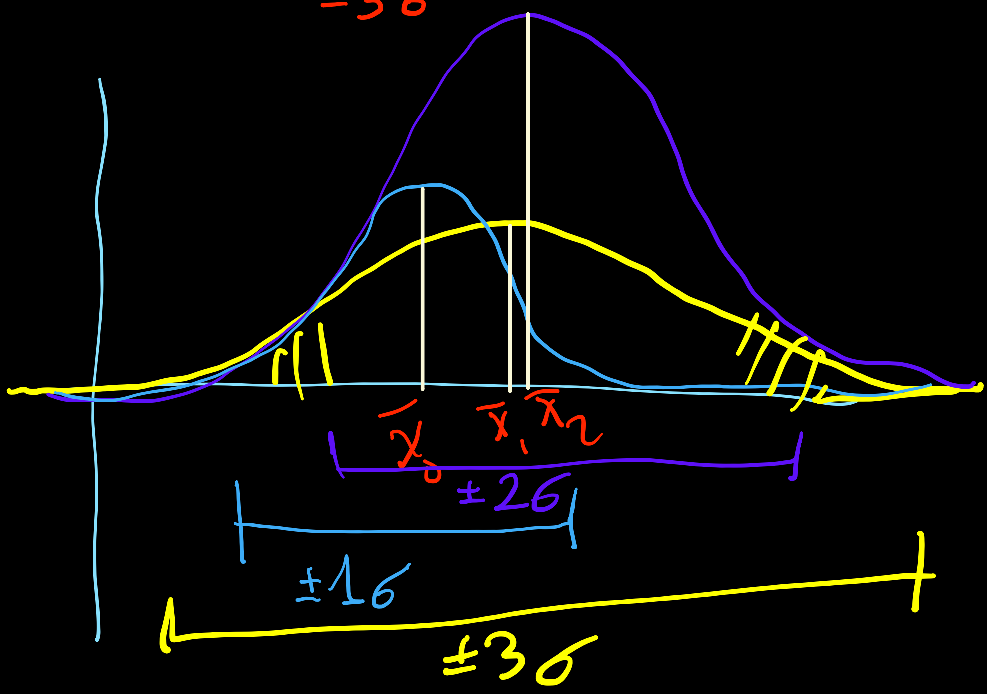
& "long run" average

Var $\boxed{\sigma}$

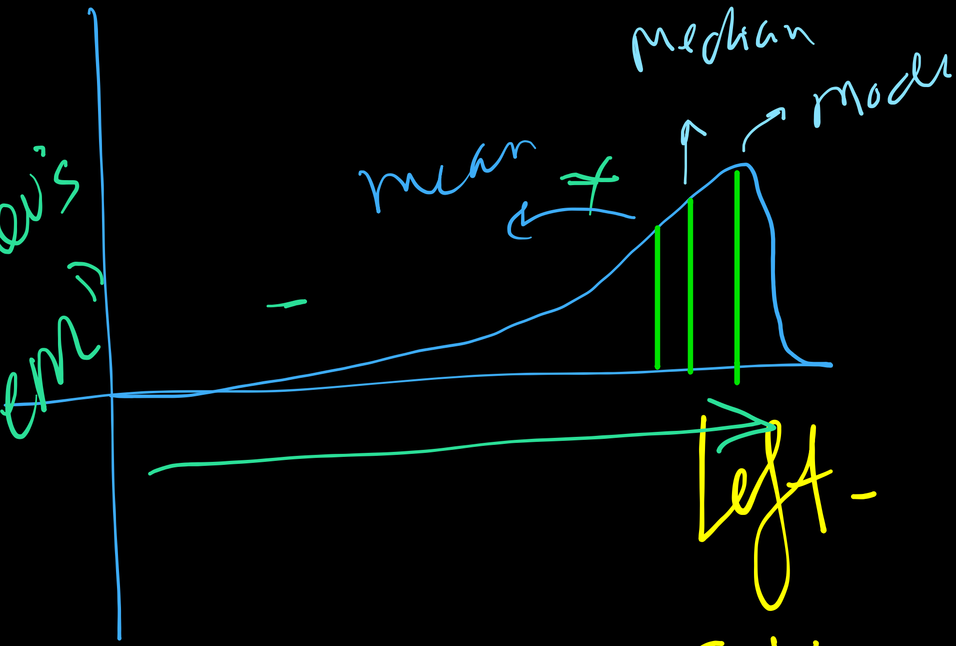
st $\boxed{S}$

Measured by "Emprical Rule"

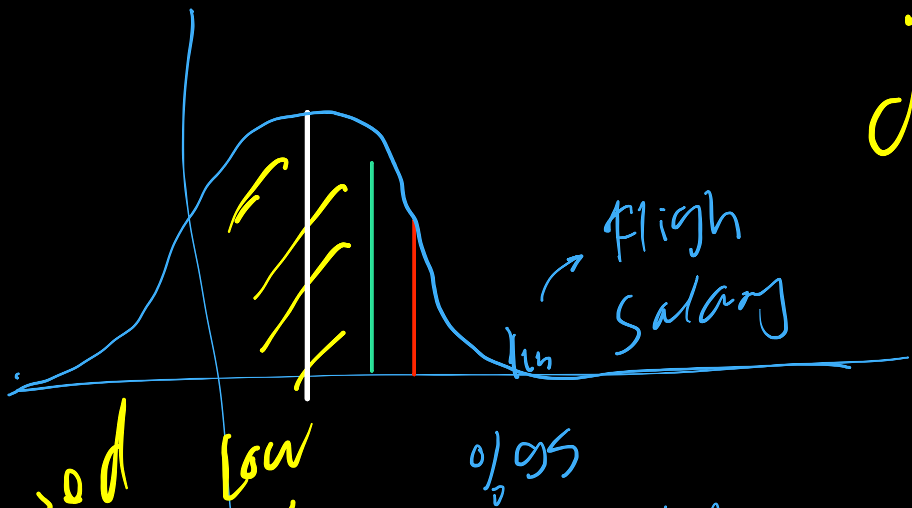




Measured by "Chebyshev's theorem"



Left-Skew distribution



Skewed to-right

Low salary

Hildebrand Rule

$$H = \frac{\bar{X} - \tilde{X}}{S}$$

$S \to \sqrt{\sigma}$

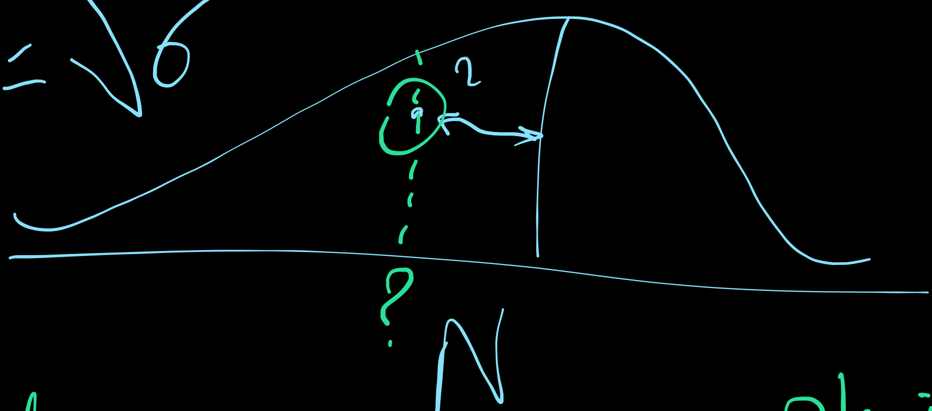
HK 20%

Gilbert Strang

Linear Algebra

$$\sigma = \frac{\sum_{i=1}^{N} (x_i - \bar{x})^2}{N}$$

$$s = \sqrt{\sigma}$$



measure the Position of a sample in the "bell-shaped" Normal distribution

$\pm 1, \pm 2, \pm 3$ [?]

$$\text{Position} = \frac{x - \bar{x}}{S} = \begin{matrix}\pm 1 \\ \pm 2 \\ \pm 3\end{matrix}$$

where; $\bar{x}$ sample mean, x is the sampled value, S is the distribution standard deviation

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Example :-

You have data

$$(3, 2, 6, 4, 5)$$

$$\bar{x} = \frac{3+2+6+4+5}{5} = 4$$

$$\sigma = \sum_{i=1}^{5} (x - \bar{x})^2 = 2$$

$$S = \sqrt{2}$$

→ Our data has mean of 4, and Standard deviation of 1.414

⇒ Now, if you want to know where exactly the data between 3 to 5 located in the distribution.

$$\frac{5-4}{\sqrt{2}} = 0.707 \simeq 1$$

$$\frac{3-4}{\sqrt{2}} = -0.701 \simeq -1$$

therefore; the data between (3-5) is located in the ±1 Std. which is 68% of data near to mean