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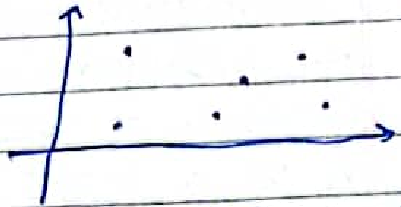
~~Note~~ Continous R.V. is uncountable, have range like weight (40 – 100) kg, marks (0 – 100) %.

* PMF (Probability mass function) graph plotting



Step 1 Def. R.E. → SS.
Step 2 Define the R.V.
Step 3 X : SS → { ... }
Step 4 find all the probabilities using PMF i.e.

$P(X=i) = {}^nC_i \times (\underbrace{p}_{\text{success}})^i \, (\underbrace{1-p}_{\text{failure}})^{n-i}$

Step 5 Plot a graph, that will show probability Distribution

* Uniform R.V. (U.R.V)

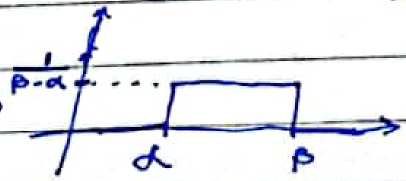
If 'X' is a U.R.V. on interval (α, β)

PDF → $P(x) = \begin{cases} \frac{1}{\beta-\alpha} & , \text{if } \alpha \le x \le \beta \\ 0 & , \text{otherwise} \end{cases}$

Probability distribution function

$\boxed{X \underset{\text{follows}}{\sim} \overset{\text{uniform}}{U} \underset{\text{range}}{(\alpha, \beta)}}$

$X \sim U(\alpha, \beta)$ →

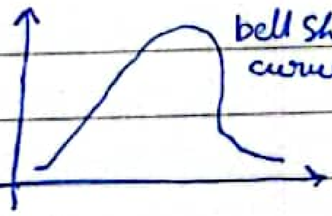


PMF

* Normal R.V. NRV

→ Use by scientists to derive ML algos

→ NRV follows most common real world graph called bell shaped curve.



bell shape curve

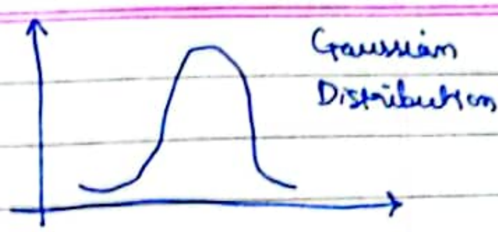
→ When we have bell shaped curve graph for probability distribution its called 'Gaussian Distribution'

→ PDF for NRV

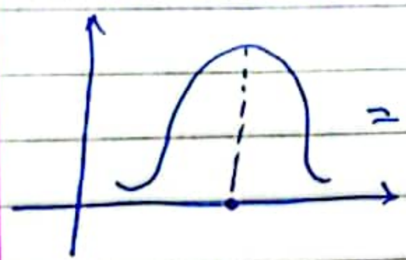
$f(x) = \frac{1}{\sqrt{2\pi}\,\sigma} \times \left(e\right)^{-\frac{(x-\mu)^2}{2\sigma^2}}$

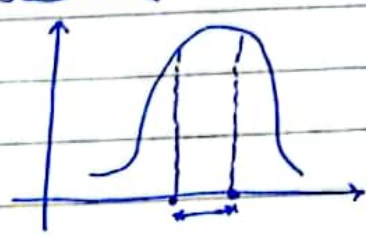
where, σ = std. dev.
μ = mean
σ^2 = variance

$$\underset{\text{R.V.}}{X} \overset{\text{follows}}{\sim} \underset{\text{normal}}{N}\left(\overset{\text{mean}}{\mu}, \underset{\text{variance}}{\sigma^2}\right)$$



note: we cant find probability @ a single point in continous random variable

 = 0



we always find probaliny in a range for continous R.V.