UNIT-IV: Discrete Probability Distributions

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Probability Mass Function (PMF)

Defines the probability of discrete outcomes. Formula: (P(X = x)).

Probability Density Function (PDF)

Describes continuous probability distributions over an interval.

Binomial Distribution

Models the number of successes in (n) independent trials. Formula: (P(X = k) = \binom{n}{k} p^k (1-p)^{n-k}).

Geometric Distribution

Models the number of trials needed for the first success. Formula: (P(X = k) = (1-p)^{k-1} p).

Negative Binomial Distribution

Generalizes the geometric distribution for multiple successes.

Poisson Distribution

Models rare events over time. Formula: (P(X = k) = \frac{e^{-\lambda} \lambda^k}{k!}).