UNIT-V: Continuous Probability Distributions

Author : Statistics Department **Date :** 2025

Continuous Distributions

Probability distributions where a random variable can take any value within a range.

Uniform Distribution

All outcomes within a given range are equally likely. Formula: $ f(x) = \frac{1}{b-a} $.

Exponential Distribution

Models waiting times between events in a Poisson process. Formula: $ f(x) = \lambda e^{-\lambda x} $.

Gamma Distribution

A generalization of the exponential distribution used in queuing theory.

Weibull Distribution

Models failure rates and reliability analysis.

Normal Distribution

A bell-shaped distribution given by: $ f(x) = \frac{1}{\sigma \sqrt{2\pi}} e^{-\frac{(x-\mu)^2}{2\sigma^2}} $.

Functions of a Random Variable

Transforming a random variable creates new distributions with different properties.