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Subject: Probability& Statistics
Date: June 9, 2023

# Assignment on Continuous Probability Distribution
PROBILITY AND STATISTICS

QUESTION:

The Normal distribution, the Exponential distribution, and the Uniform distribution. We will discuss their probability density functions (PDFs), graph their distributions, and provide examples of their applications.

Normal Distribution:

PDF: The probability density function of the Normal distribution is defined by its mean (μ) and standard deviation (σ). The PDF equation is given by:
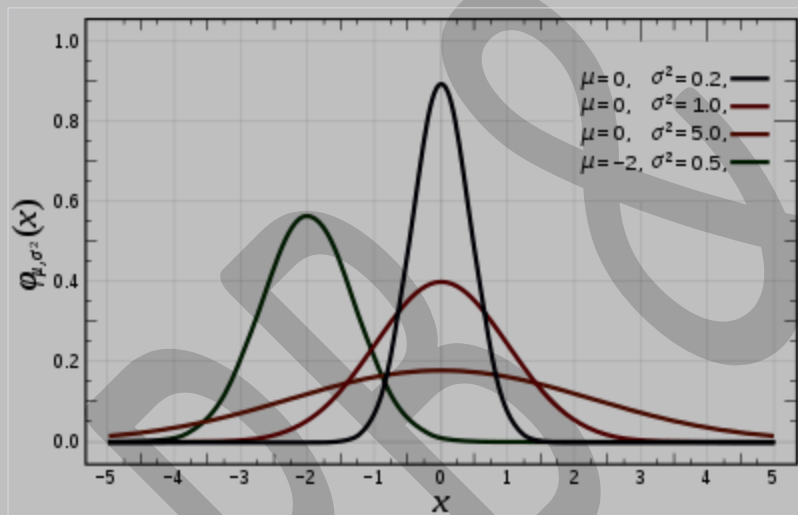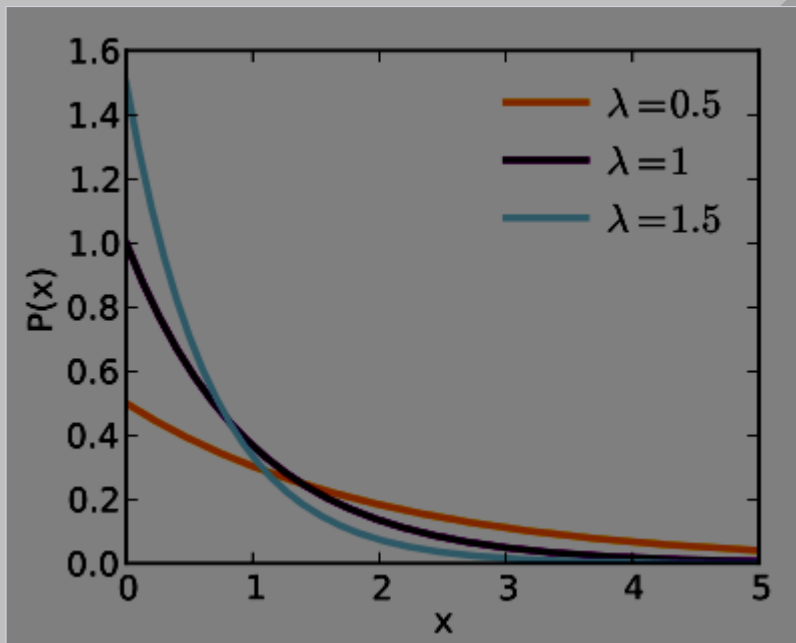

Normal Distribution PDF:

Graph: The Normal distribution has a bell-shaped curve that is symmetric around its mean. The mean represents the center of the distribution, and the standard deviation determines the spread of the data.

Applications: The Normal distribution is widely used in statistics and data analysis. It describes many natural phenomena, such as height and weight

distributions in populations. It is also used in hypothesis testing, confidence interval estimation, and modeling errors in scientific experiments.

<u>Exponential Distribution:</u>
PDF: The probability density function of the Exponential distribution is defined by its rate parameter (λ). The PDF equation is given by:


<u>Exponential Distribution PDF:</u>

Graph: The Exponential distribution is characterized by a decreasing exponential curve. It represents the probability of time intervals between events in a Poisson process, where events occur continuously and independently at an average rate.

Applications: The Exponential distribution is used in various fields, such as reliability engineering, queuing theory, and survival analysis. It models the time until failure of systems, waiting times in a queue, and duration until an event occurs.

Uniform Distribution:

PDF: The probability density function of the Uniform distribution is defined by its minimum value (a) and maximum value (b). The PDF equation is given by:
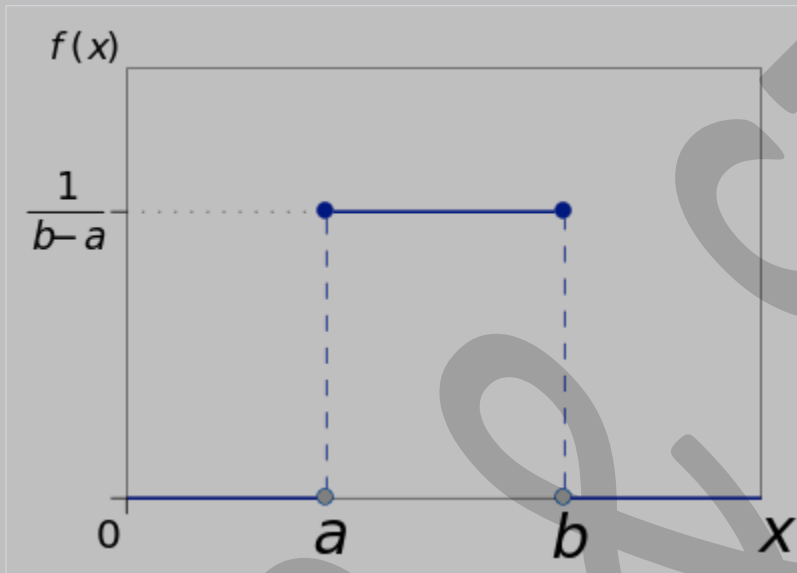
Uniform Distribution PDF:

Graph: The Uniform distribution has a constant probability density over a defined interval. The PDF forms a rectangular shape with equal probabilities within the interval.

Applications: The Uniform distribution is often used when modeling situations where all outcomes within a given range are equally likely. It is used in simulations, random number generation, and in cases where no specific knowledge about the distribution is available.

These are just a few examples of continuous probability distributions. Understanding these distributions and their applications can greatly assist in analyzing and interpreting data in various fields of study, including statistics, physics, engineering, and finance.