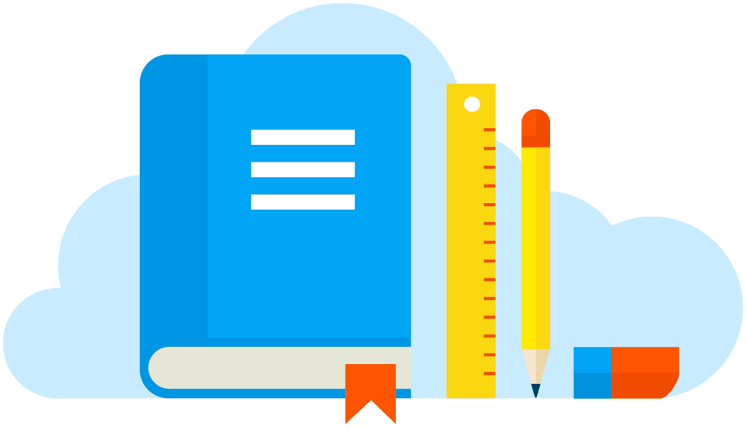


Data Science Notes by Sarowar Ahmed

📊 Chapter: Probability Theory

📊 Topic: Exponential Distribution

🔎 Hello, GitHub family! Today, we're delving into the intriguing realm of the Exponential Distribution, a powerful concept in probability theory that sheds light on the timing of events. I'll guide you through this topic in a way that's simple and engaging for everyone!

🌟 What is the Exponential Distribution?

▪ Imagine you're waiting for a bus. The time it takes for the next bus to arrive can vary, but the longer you wait, the more likely it is to

arrive soon. The Exponential Distribution helps us understand the probability of waiting a certain amount of time before an event occurs, given that it occurs randomly and independently at a constant rate.

📐 Formula for Exponential Distribution:

▪ The probability density function (PDF) of the exponential distribution is given by:

f(x| λ) = λe^(−λx)

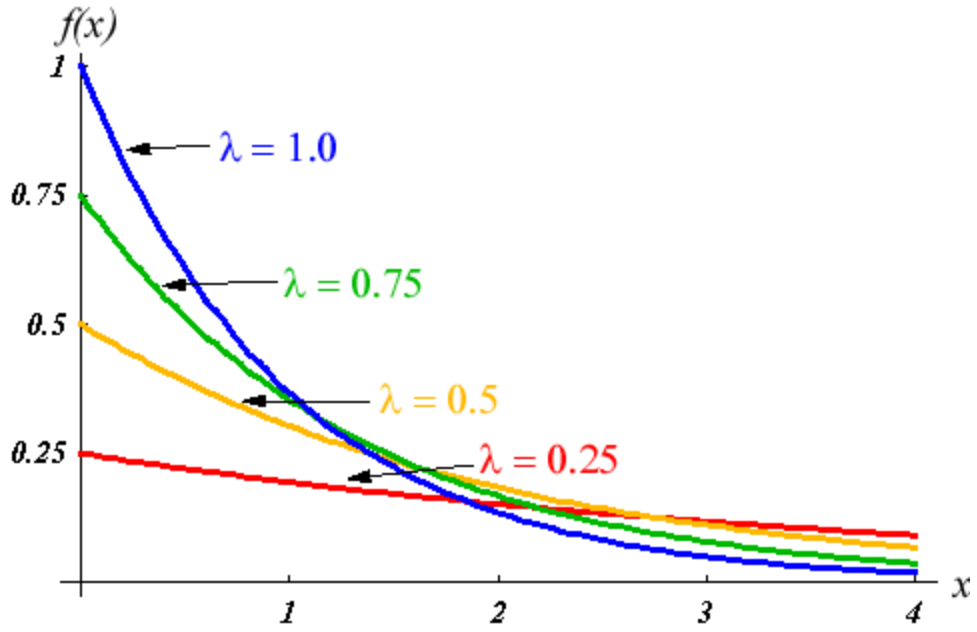
Where:
▪ λ (lambda) is the rate parameter, representing the average number of events occurring per unit time.
▪ x is the time elapsed since the last event.

📊 Examples of the Exponential Distribution:

Arrival Times:
▪ Suppose buses arrive at a bus stop with an average rate of 10 buses per hour. The exponential distribution can help us calculate the probability of waiting less than 5 minutes for the next bus.

Radioactive Decay:
▪ Radioactive atoms decay randomly over time, with the rate of decay determined by their half-life. The exponential distribution can model the time it takes for a certain percentage of atoms to decay.

🖼️ Visualizing the Exponential Distribution:



🚀 Why Does This Matter?

▪ The Exponential Distribution has applications in various fields, including queuing theory, reliability engineering, and finance. It provides insights into the timing of events and helps us make informed decisions based on probabilities.

Got any questions about Binomial Distribution!? Feel free to ask me via Linkedin! Let's keep learning together.

My LinkedIn Date: 14/04/2024