

Poisson Distribution

The Poisson distribution is a discrete probability function that means the variable can only take specific values in a given list of numbers, probably infinite. A Poisson distribution measures how many times an event is likely to occur within "x" period of time. In other words, we can define it as the probability distribution that results from the Poisson experiment.

Single Parameter (λ):

The Poisson distribution is characterized by a single parameter, λ (lambda), which represents the **average** number of events occurring in the specified interval. Higher λ values indicate a higher likelihood of more frequent events.

Probability Mass Function (PMF):

$$P(X = k) = (\lambda^k * e^{-\lambda}) / k!$$

- **k:** Represents the number of events (0, 1, 2, ...)
- **λ :** Represents the average rate of events
- **e:** Represents the base of the natural logarithm (approximately 2.71828)
- **k! (factorial of k):** Represents the product of all positive integers less than or equal to k (e.g., $3! = 3 * 2 * 1$)