Introduction to Poisson Regression with Robust Standard Errors - Part 1

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Goals of this Video

The goal is to cover the Poisson distribution

$\rightarrow$ If you have prior knowledge of the Poisson distribution, feel free to move ahead to the second video in which we will begin introducing the Poisson Regression model

The Poisson Distribution

A random variable Y is said to have a Poisson distribution with parameter λ if its probability is given by the probability mass function

$$Pr(Y = y) = \frac{e^{-\lambda}\lambda^y}{y!}$$

for $\lambda > 0$ and $y = 0, 1, 2, ...$

Expected Value and Variance

For a random variable $Y \sim Poisson(\lambda)$, the expected value (mean) and variance can be shown to be

$$E(Y) = Var(Y) = \lambda$$

Note: $E(Y)$ and $Var(Y)$ are equal to each other- this will be important to consider when we talk about regression!

Uses for the Poisson Distribution

The Poisson distribution is used to describe random variables that give the count of some event per unit time, space, or other grouping

For example:

- W = number of emergency phone calls per square kilometer in a region
- X = number of accidents at an intersection per week
- Y = number of births at a hospital per day

In the next video:

- Discuss how this distribution helps us model data
- Learn the theory behind the Poisson Regression Model