Further Stats 1

Contents

Probability Distributions

Poisson

The Poisson distribution is used to model a situation where an event occurs at a fixed rate.

You can model X as a Poisson distribution if:

- The events must occur independently
- They must occur singly in space or time
- The events must occur at a constant average rate

$$\text{If } X \sim \text{Po}(\lambda), \text{ then } \boxed{P(X = x) = \frac{e^{-\lambda}\lambda^x}{x!}} \ (x \geq 0)$$

Geometric

The Geometric distribution is used to model a situation where you try an event several times until a success occurs, and you want to know how many tries it will take.

You can model X as a Geometric distribution if:

- Each attempt is independent
- Each attempt has the same probability

$$\text{If } X \sim \text{Geo}(p), \text{ then } \boxed{P(X = x) = p(1-p)^{x-1}} \ (x > 0)$$

- $\boxed{P(X \leq x) = 1 - (1-p)^x}$
- $P(X > x) = (1-p)^x$
- $\boxed{P(X \geq x) = (1-p)^{x-1}}$
- $P(X < x) = 1 - (1-p)^{x-1}$