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

If $X \sim \text{Po}(\lambda)$, then

Formula Book

$$P(X = x) = \frac{e^{-\lambda}\lambda^x}{x!} \quad (x \geq 0)$$

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

If $X \sim \text{Geo}(p)$, then

Formula Book

$$P(X = x) = p(1-p)^{x-1} \quad (x > 0)$$

Remember

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

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