Geometric distribution

Intro

Given n trials and probability of success p, 1th time to success exactly at nth trial.

(i.e. failure on n-1 trials and success on nth trial)

Probability

Proof:

It’s to simple. Thus, I skip it.

Expected Value

Proof:

List and solve the equation.

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Variance

Proof: (Wrong proof)(don’t care about it)

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With

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=>

or

Let’s get started with positive one.

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Let’s get started with negative one.

Ref

For all intro and some proof,

[Geometric distribution - Wikipedia](https://en.wikipedia.org/wiki/Geometric_distribution)

For more proof,

[Geometric distribution | Properties, proofs, exercises (statlect.com)](https://www.statlect.com/probability-distributions/geometric-distribution)