



geometric random variable

Canonical name	GeometricRandomVariable
Date of creation	2013-03-22 11:54:06
Last modified on	2013-03-22 11:54:06
Owner	mathcam (2727)
Last modified by	mathcam (2727)
Numerical id	14
Author	mathcam (2727)
Entry type	Definition
Classification	msc 62-00
Classification	msc 60-00
Classification	msc 92-01
Classification	msc 92B05
Synonym	geometric distribution

A **geometric random variable** with parameter $p \in (0, 1]$ is one whose density distribution function is given by

$$f_X(x) = p(1-p)^x, \quad x = 0, 1, 2, \dots$$

This is denoted by $X \sim Geo(p)$.

Notes:

1. A standard application of geometric random variables is where X represents the number of failed Bernoulli trials before the first success.
2. The expected value of a geometric random variable is given by $E[X] = \frac{1-p}{p}$, and the variance by $Var[X] = \frac{1-p}{p^2}$.
3. The moment generating function of a geometric random variable is given by $M_X(t) = \frac{p}{1-(1-p)e^t}$.