

Probability Distributions Codebook

Data Science Team

2025-12-19

7 variables documented

Table of Contents

normal	3
exponential	4
uniform	5
poisson	6
binomial	7
beta	8
gamma	9

normal

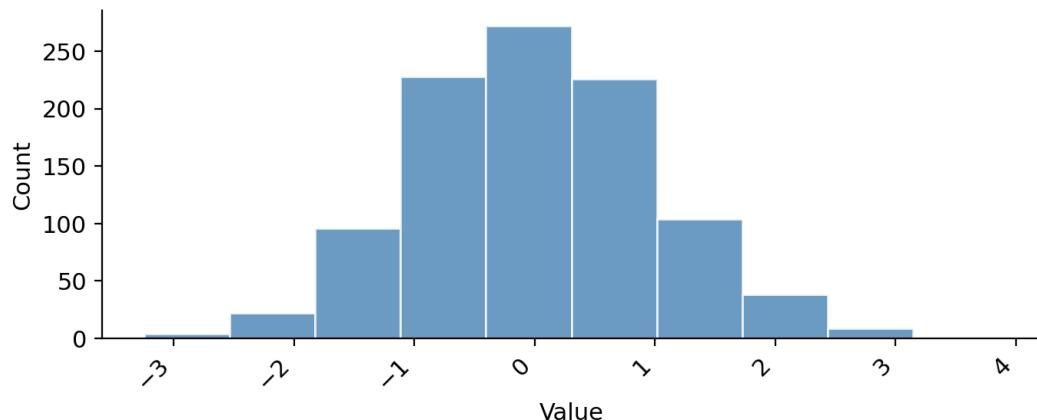
Standard normal distribution

Type: float64

Note: Parameters: μ (mean) = 0, σ (std dev) = 1. The normal distribution is symmetric and bell-shaped, commonly used to model natural phenomena.

Summary Statistics

Count	1000
Valid	1000
Missing	0 (0.0%)
Unique	1000
Mean	0.02
Std Dev	0.98
Min	-3.2412673400690726
Max	3.852731490654721



exponential

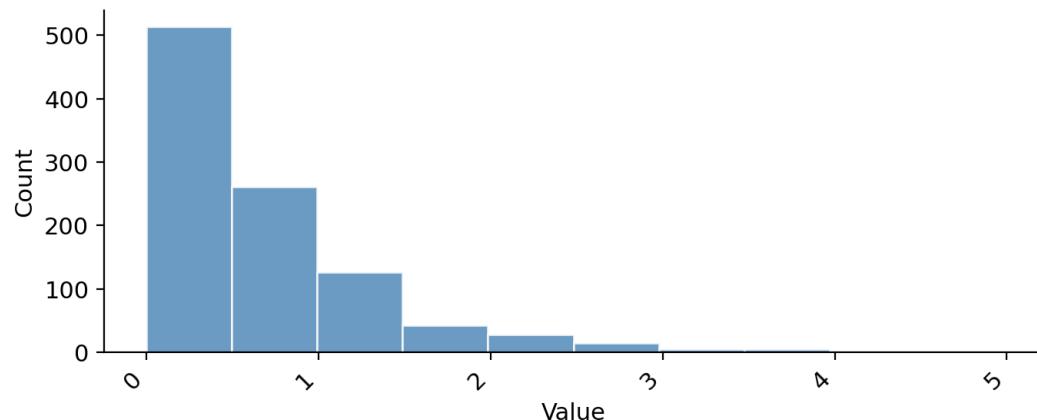
Exponential distribution

Type: float64

Note: Parameters: λ (rate) = 1.5. Models time between events in a Poisson process. Commonly used for survival analysis and reliability engineering.

Summary Statistics

Count	1000
Valid	1000
Missing	0 (0.0%)
Unique	1000
Mean	0.67
Std Dev	0.67
Min	0.00214896890148975
Max	4.961148606469603



uniform

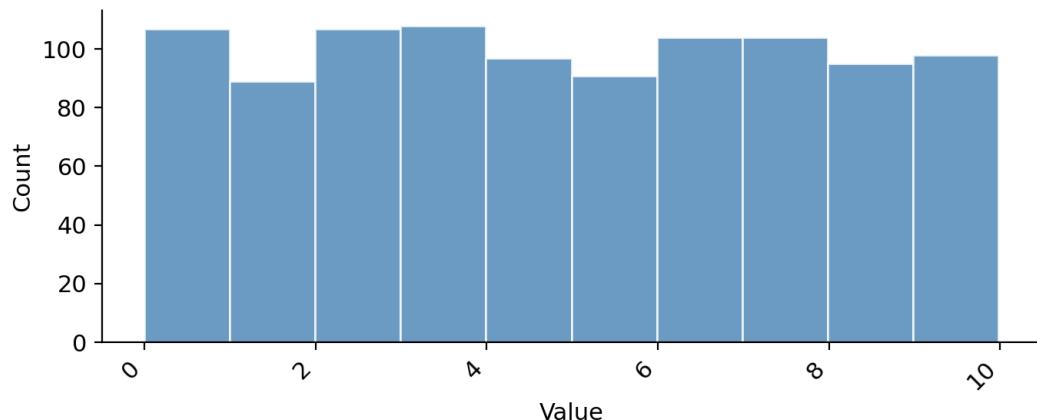
Continuous uniform distribution

Type: float64

Note: Parameters: a (min) = 0, b (max) = 10. Every value in the interval has equal probability. Used for random sampling and Monte Carlo simulations.

Summary Statistics

Count	1000
Valid	1000
Missing	0 (0.0%)
Unique	1000
Mean	4.94
Std Dev	2.89
Min	0.00011634755366141114
Max	9.978208556819782



poisson

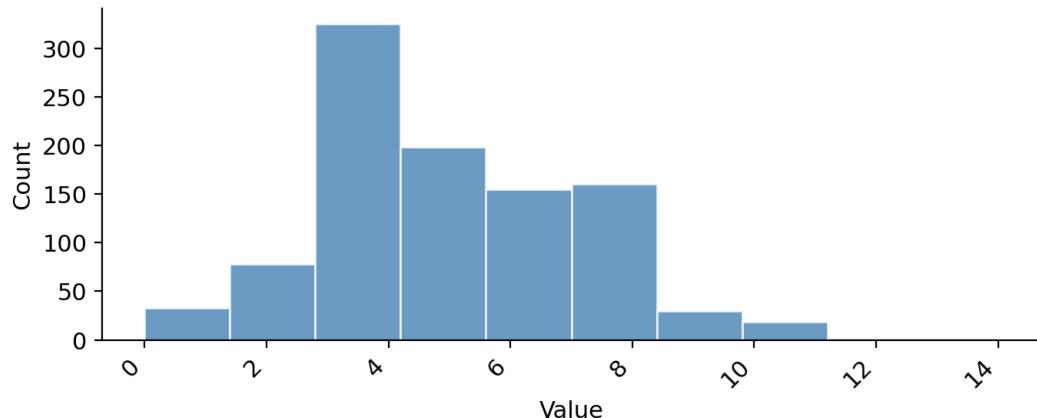
Poisson distribution

Type: int64

Note: Parameters: λ (rate) = 5. Models count of events in a fixed interval. Common in queueing theory and epidemiology.

Summary Statistics

Count	1000
Valid	1000
Missing	0 (0.0%)
Unique	14
Mean	4.93
Std Dev	2.07
Min	0
Max	14



binomial

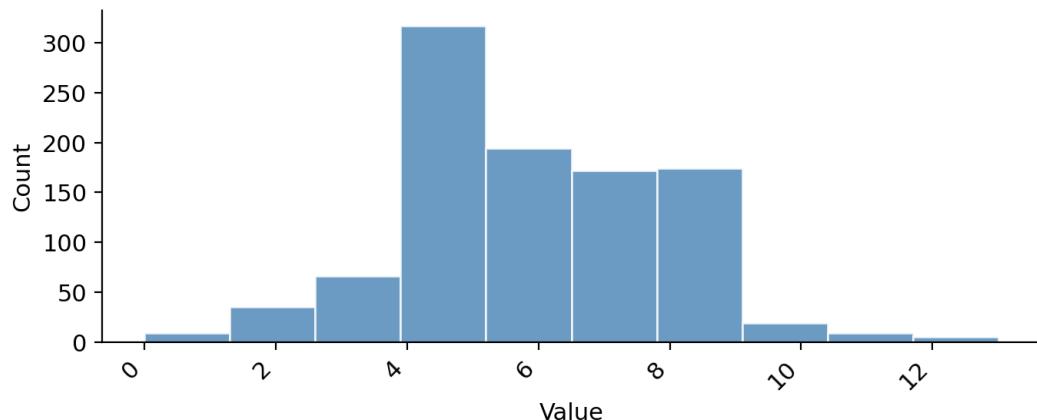
Binomial distribution

Type: int64

Note: Parameters: n (trials) = 20, p (success probability) = 0.3. Models number of successes in a fixed number of trials. Used in quality control and clinical trials.

Summary Statistics

Count	1000
Valid	1000
Missing	0 (0.0%)
Unique	14
Mean	5.90
Std Dev	2.01
Min	0
Max	13



beta

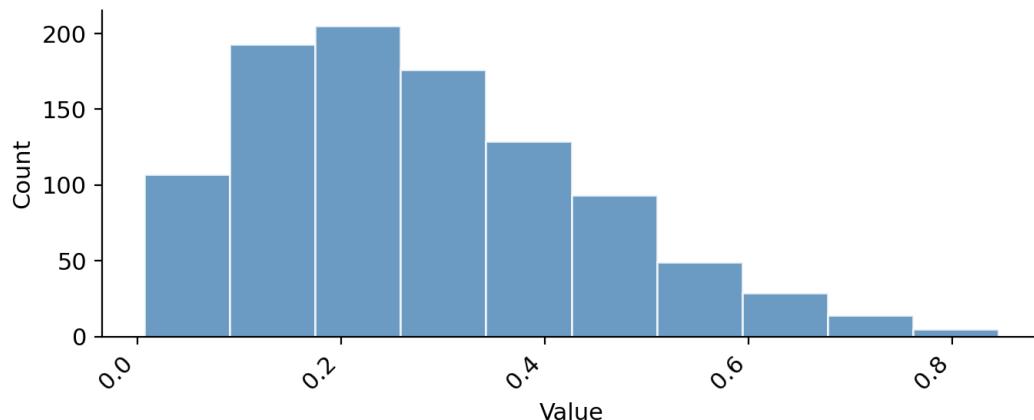
Beta distribution

Type: float64

Note: Parameters: α (shape) = 2, β (shape) = 5. Bounded between 0 and 1, useful for modeling proportions. Common as a prior in Bayesian statistics.

Summary Statistics

Count	1000
Valid	1000
Missing	0 (0.0%)
Unique	1000
Mean	0.28
Std Dev	0.16
Min	0.007263757171461416
Max	0.8449393803434533



gamma

Gamma distribution

Type: float64

Note: Parameters: k (shape) = 2, θ (scale) = 2. Generalizes the exponential distribution. Used to model waiting times and insurance claims.

Summary Statistics

Count	1000
Valid	1000
Missing	0 (0.0%)
Unique	1000
Mean	3.99
Std Dev	2.88
Min	0.13633696830598757
Max	17.785205693156033

