A Brief of Dist Package

Dist package in ciw having all the distribution function in it that a user can use for inter-arrival time and service time. Methods are: -

Uniform

It takes two argument that should a positive integer and will return a value between these two including the boundary using the uniform function from python random package.

Deterministic

It will take a single positive number as argument and return that only.

Triangular

It takes 3 arguments lower bound, upper bound and mode and generate a float number between lower and upper bound inclusively while minimizing the difference from mode. It uses triangular method of random package.

Exponential

It take a parameter that is the rate of growth of exponential distribution and return a random float numbers from that distribution. Rate can be float number and less than 1. It uses expovariate function of random package.

Gamma

It takes two parameters namely shape and space and based on that generates a gamma distribution using gamavariate package of random package and return a random number from that.

Normal

It takes two arguments mean and standard deviation and generate a truncated normal distribution from them using normalvariate of random package.

Lognormal

It takes two arguments mean and standard deviation and generate normal distribution from them using lognormvariate of random package. In probability theory, a log-normal (or lognormal) distribution is a continuous probability distribution of a random variable whose logarithm is normally distributed.

Weibull

It takes two parameter shape and scale and use weibullvariate function from random package. It generate a Weibull distribution and return random number from that.

Empirical

This function takes in an array of values to make a choice from, and an pdf corresponding to those values. It returns a random choice from that array, using the probs as weights.

Sequential

It takes a sequence and return value from that and keep repeating in circle.

Pmf

Probability mass function it takes values with their probability distribution (sum of probability distribution must be 1) and used that as an function to generate and return the value.

Phase type

It uses a phase distribution that is A phase-type distribution is a probability distribution constructed by a convolution or mixture of exponential distributions. It results from a system of one or more inter-related Poisson processes occurring in sequence, or phases. The sequence in which each of the phases occurs may itself be a stochastic process.

Erlang

It takes two parameters namely shape and size and generate a erlang distribution based on them. The Erlang distribution is the distribution of a sum of k independent exponential variables with mean 1/lambda each. Equivalently, it is the distribution of the time until the kth event of a Poisson process with a rate of lambda . When k=1, the distribution simplifies to the exponential distribution. The Erlang distribution is a special case of the gamma distribution wherein the shape of the distribution is discretized.

HyperExponential

It is an advanced version of exponential distribution.

Takes:

- `rates` a vector of rates for each phase
- `probs` a probability vector for starting in each phase

HyperErlang

It is an advanced version of erlang distribution

Takes:

- `rates` a vector of rates for each phase
- `probs` a probability vector for starting in each phase
- `phase_lengths` the number of sub-phases in each phase

Coxian

It is a generalized version on erlang distribution

Takes:

- `rates` a vector of rates for each phase
- `probs` a vector of the probability of absorption at each phase

NoArrivals

A placeholder distribution if there are no arrivals.