Variable – an alphabetic character that represents a value / some physical phenomenon that can change and consequently resulting in different value of respective function, as in

 $f(x), x \in [0,1]$

Random variable – variable that can take on a set of possible different values, each with an associated probability, in contrast to other mathematical variables.



Probability distribution – mathematical function that describes the possible values of a random variable and their associated probabilities.

Exponential Distribution

Random variable with Exponential(λ **) distribution** has the following probability density and cumulative probability functions ...

$$f(x;\lambda) = \begin{cases} \lambda e^{-\lambda x} & x \ge 0, \\ 0 & x < 0. \end{cases}$$

$$F(x;\lambda) = \begin{cases} 1 - e^{-\lambda x} & x \ge 0, \\ 0 & x < 0. \end{cases}$$







A random variable (e.g., overall number of passenger/packet arrivals) has a Poisson distribution with parameter λ if and only if the time elapsed between two successive occurrences of the event has an exponential distribution with parameter λ and it is independent of previous occurrences.

