Ithas one parameter(scale parameter). It is a special case of Gamma distribution. It is +vely skeweed and Leptokurtic. It plays important role in queuing theory and reliability theory. The time between arrival at service facilities, time to failure of electrical component or system are some examples of application of exponential distribution.

The most important applications of the exponential distribution are the situations wherer Poisson process applies. Poisson distribution is used to compute the probability of specific number of events during a particular period of time or space. In situations where the time period or space is random variable, the exponential distribution comes into play.

In Poisson distribution, the parameter , is the mean number of events / occurances per unit time. Now consider the time required for the first event to occur. In poisson distribution, the probability of no events occurring in time spane “t” is given as

Let t = X be the time to the first Poisson event. The probability that the length of time, until the first event, will exceed x is the same as the probability that no Poisson events will occur in time x. The later is given by . . Thus the cumulative distribution function is given as

. If we differentiate the CDF w.r.to x, then which is the pdf of exponential distribution with parameter . The mean of the exponential distribution is the reciprocal of the parameter of the Poisson distribution. The Poisson distribution is memory less because the occurance in the successive time periods are independent. The parameter is the mean time between events. In reliability theory, where the equipment failure often conforms to Poisson process, is called **mean time between failures**. Other applications include survival time in bio-medical experiments and computer response time.

**Total area**

**Mean and variance**

**r-th moment about zero**

**Moment generating function**

**Cumulant generating function**

**Mean deviation**

Substituting from (2) and (3) into (1), gives

**Distribution function**

**Median**

**Quartile , deciles and percentiles**