Types of probability distribution

➢ Discrete distribution

Properties: (0<=P(x)<=1) and ∑P(x)=1

- Poisson distribution
  used when X is a given in interval and the number of occurrences in one interval is the same number in other interval

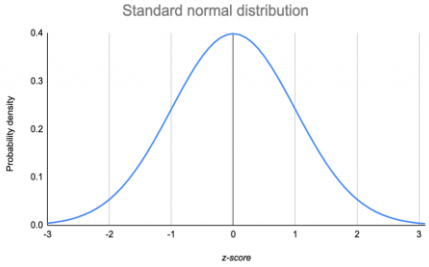
- Binomial distribution

  used when I have 2 two possible outcome for each trial and outcome for each trial are independent

➢ Continuous distribution

Properties: p(a<=X<=b)=$\int_a^b f(X)dx$ for f(x)>=0

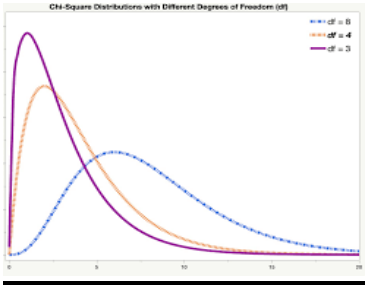
- Normal distribution



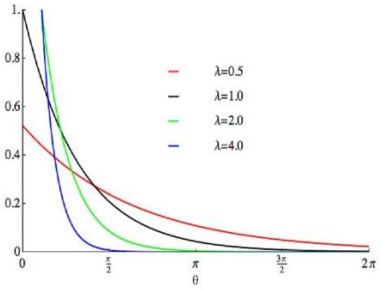
- T-distribution

  The t-distribution is used when data are approximately normally distributed, which means the data follow a bell shape but the population variance is unknown. The variance in a t-distribution is estimated based on the degrees of freedom of the data set (total number of observations minus 1)

- Chi-squared

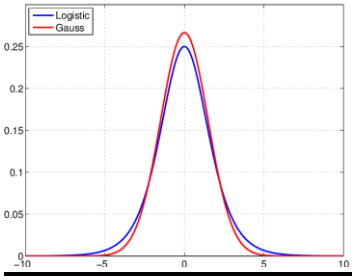


- Exponential



used when events rapidly changing
and measure the expected time for an event to occur

- Logistic



logistic distribution is used for modeling growth, and also for logistic regression. It is a symmetrical distribution, unimodal (it has one peak) and is similar in shape to the normal distribution

How convert any type to normal distribution

Box cox: way to convert any non normal distribution to normal distribution

- Must all data be non negative
- $-5 < \lambda < 5$

$$y_i^{(\lambda)} = \begin{cases} \dfrac{y_i^\lambda - 1}{\lambda} & \text{if } \lambda \neq 0, \\ \ln(y_i) & \text{if } \lambda = 0, \end{cases}$$