Summary

- The probability distribution of sample mean or total drawn from a population can be derived using Central Limit Theorem
- The important implication of the normal convergence is that for a large n, each percentage point of the distribution of Y will be close to the value computed from a normal distribution with mean μ and variance σ^2, independent of whether Y has these moments or not
- In normal convergence, the limiting distribution is always continuous (in fact Normal) no matter whether Y is continuous or not
- Historically, the first CLT was obtained in the first part of 18^{th} century by De Moivre who sharpened Bernoulli's theorem and stated that the variables of a Bernoulli sequence obey the Central Limit Law
- The present form is due to Laplace and hence it goes by the name of both being called De Moivre- Laplace Theorem
- In probability theory, the De Moivre–Laplace theorem is a normal approximation to the binomial distribution. It is a special case of the central limit theorem
- De Moivre–Laplace theorem states that the binomial distribution of the number of "successes" in n independent Bernoulli trials with probability p of success on each trial is approximately a normal distribution with mean np and standard deviation $\sqrt{npq}$, if n is very large and some conditions are satisfied
- Mathematically, De Moivre–Laplace theorem states that as n grows large, for k in the neighborhood of np we can approximate

$$\binom{n}{k} p^k q^{n-k} \simeq \frac{1}{\sqrt{2\pi npq}} e^{-(k-np)^2/(2npq)}, \quad p+q=1,\ p>0,\ q>0$$

  The ratio of the left-hand side to the right-hand side converges to 1 as $n \to \infty$
- Laplace expanded De Moivre's approximation to Bernoulli trials with any probability of success