

Central-Limit-Theorem

Mahendra Plotly

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Central Limit Theorem

The central limit theorem states that the sampling distribution of the sample mean approximates the normal distribution, regardless of the distribution of the population from which the samples are drawn if the sample size is sufficiently large. This fact enables us to make statistical inferences based on the properties of the normal distribution, even if the sample is drawn from a population that is not normally distributed.

The central limit theorem can be stated as follows with regard to the sample mean: Let x_1, \dots, x_n be a random sample from one population with mean μ and variance σ^2 .

$$\bar{x} \sim N(\mu, \sigma^2/n)$$

even if the underlying distribution of individual observations in the population is not normal.

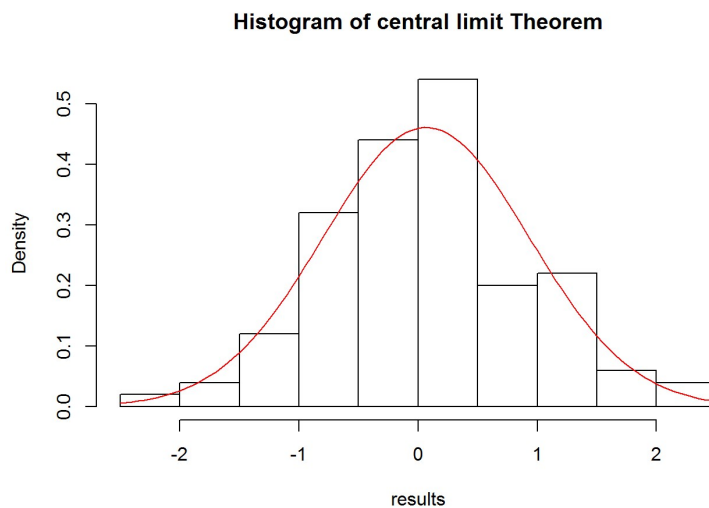
above formula can be written as:

$$z = (\bar{x} - \mu) / (\sigma/\sqrt{n})$$

At first we create 100 random numbers by using for loop iterates over some specified set of values such as the numbers 1 through 100. we need them to store the results somewhere. This is done using a vector and assigning each of its values one at a time.

```
results = c()
mu = 0
sigma = 1
for(i in 1:100){
  x = rnorm(100, mu, sigma)
  results[i] = (mean(x) - mu) / (sigma/sqrt(100))
}
```

Including plots



Note that the `echo = FALSE` parameter was added to the code chunk to prevent printing of the R code that generated the plot.