1. Let be independent and identically distributed random variables with the same mean and variance , and let denote the sample mean. Use the Central Limit Theorem (CLT, page 156 in our textbox) to establish the following (asymptotic when ) statements:
2. The statement

holds with probability .

Using the CLT, as

Therefore,

But since,

Then,

1. The statement

holds with the probability 0.95. NOTE: The statement about give the following (asymptotic when ) 95% confidence interval

Then,

Therefore, using the CLT, as

And,

1. The statement

holds with the probability 0.95.

Then,

Therefore, using the CLT, as

And,

1. Let be a sample from a population , and let be a filter (that is, a random variable in Statistics, or a measurable function in Mathematics) that produces outputs (called observations in Statistics) by the formula . Let denote the average of . Does the 95% confidence interval

cover the (unknown) population mean or not?

The confidence interval covers the population mean with a confidence percentage of 95%.