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Exercise: CI's via the CLT

(2/2 points)

The sample mean estimate $\widehat{\Theta}$ of the mean of a random variable with variance 1, based on 100 samples, happened to be 22. The 80% confidence interval provided by the CLT is of the form $[a, b]$, with:

$a =$ 21.87184 ✔ **Answer:** 21.872

$b =$ 22.12816 ✔ **Answer:** 22.128

Your answers should include at least 2 decimal digits.

You may want to refer to the normal table . For your reference, if we had 95% instead of 80%, the confidence interval would be of the form

$$\left[\widehat{\Theta} - \frac{1.96\sigma}{\sqrt{n}}, \widehat{\Theta} + \frac{1.96\sigma}{\sqrt{n}}\right].$$

Answer:
The number 1.96 for the 95% confidence interval was chosen because we wanted to have 2.5% probability at either tail of the normal, and using the fact $\Phi(1.96) = 0.975$. In this case, we want to have 10% probability at each tail, and we need to find a value z such that $\Phi(z) = 0.9$. From the normal table, the closest choice is $z = 1.28$. We therefore obtain

$$\left[\widehat{\Theta} - \frac{1.28\sigma}{\sqrt{n}}, \widehat{\Theta} - \frac{1.28\sigma}{\sqrt{n}}\right],$$

or

$$[22 - 1.28/10, 22 + 1.28/10] = [21.872, 22.128].$$

You have used 1 of 2 submissions

Solved problems

Additional theoretical material

Problem Set 8
Problem Set 8 due Apr 27, 2016 at 23:59 UTC

Unit summary