

University of Toronto
Department of Computer & Mathematical Sciences
STAB57: an Introduction to Statistics
Week 7 Assignment

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This week's list of problems is based on the material from:
Chapter 6, §3
You are expected to work on this list of problems prior to the upcoming tutorial.
Problems have the following tags:
🔒: difficult, 📖: Book exercise, Ⓔ: extra exercise

Terminology and Concepts to learn:

- confidence intervals
- likelihood intervals
- t-statistic
- z - and t -confidence intervals
- hypothesis testing
- p -values

Problem 1 📖

Practice your skills on hypothesis testing 6.3.1,2,3,4,6

Problem 2 📖

Go over example 6.3.7 explaining how the central limit theorem can be used to infer a confidence interval for the Bernoulli model. Then do problem 6.3.11 and 6.3.13

Problem 3 

Recall the Γ -function from week 3. The t-distribution is defined as follows:

$$f_U(u) = \frac{\Gamma(\frac{n+1}{2})}{\sqrt{\pi}\Gamma(\frac{n}{2})} \left(1 + \frac{u^2}{n}\right)^{-(n+1)/2} \frac{1}{\sqrt{n}}$$

Give a simple description of this distribution if the parameter is $n = 1$.

Problem 4 

Let S be the Poisson-model where $P_\lambda \sim \text{Poisson}(\lambda)$.

- Write down what a likelihood interval looks like in this case
- Use the above to find a 95%-confidence interval