

# ST 501 Assignment 7 (Bonus)

## Instruction

This assignment consist of 6 problems.

The assignment is due on **Sunday, November 24** at 11:59pm EDT. Please submit your assignment electronically through the **Moodle** webpage. This assignment is optional. A **good faith** effort at completing the assignment (we will be lenient in the grading provided that your submitted work is reasonable and is done in good faith) is worth 3% of the final grade and will also help you prepare for your final exam.

**All problems**, unless stated otherwise, are from your textbook *Mathematical Statistics and Data Analysis* by John A. Rice. Therefore, when we write problem  $x.y$  we meant problem  $y$  from chapter  $x$  of the textbook.

- Problem 3.62
- Problem 4.56
- Problem 5.4
- Problem 5.10
- Additional problem 1: Suppose  $X$  is uniformly distributed on  $[0, 1]$ . Given  $X = x$ ,  $Y$  is uniformly distributed on  $[0, x]$ . Compute  $E[X | Y = y]$ .
- Additional problem 2: Delta method and normal approximation. Let  $X_1, X_2, \dots$  be iid Bernoulli random variable with success probabability  $0 < p < 1$ . Let  $\bar{X} = \frac{1}{n} \sum_{i=1}^n X_i$ . Find the normal approximation for for

$$\sqrt{\frac{\bar{X}}{1 - \bar{X}}}.$$

- Additional problem: