MATH 4/6636: INTRODUCTION TO STATISTICAL THEORY

FALL 2015

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Office Hours: Wednesday 4-5, T,Th 4:30-5:30, or by appointment

Objectives

The two main objectives of this course are to introduce students to the theory of statistical estimation and testing. In order to ensure that everyone in the class is on approximately even keel, we will spend about two weeks reviewing many topics related to standard distributions, starting with the binomial to the multinomial among the discrete distributions, and the uniform to the gamma among continuous distributions.

All the topics to be covered are included in Chapters $4, 5, 6, 7$ and 8 of the text. In Chapter 8, we will cover sections $1 - 3$ and if time permits, sections $5 - 7$. These topics will be covered in the following order:

- **DISTRIBUTION THEORY**

  1. Bivariate Distributions

  2. Distribution of functions of two or more random variables

  3. Random Variables associated with the Normal Distribution

  4. The Central Limit Theorem and applications

  5. t and F distributions

  6. Sampling Distribution of a statistic

- **ESTIMATION**

  1. The Likelihood Function

  2. Maximum Likelihood Estimation

  3. Method of Moments Estimation

  4. Confidence Interval Estimation

  5. Bayes Estimation

  6. Unbiased Estimators

  7. Sufficient Statistics

- **HYPOTHESES TESTING**

  1. Type I and Type II errors

  2. Level of Significance and Power of tests

  3. The basic Neyman Pearson Lemma

  4. Testing about equality of means, and equality of variances from two Normal samples

  5. Testing about proportions

  6. Likelihood Ratio Tests

  7. P-values

  8. Sample Size Estimation

Text

PROBABILITY AND STATISTICAL INFERENCE Ninth Edition, **Prentice Hall** Hogg, Tanis and Zimmerman

Homework Assignments

There will be weekly homework assignments. Assignments will count for 20% of your course grade.

Tests and Final Exam

There will be two tests and a Comprehensive Final Exam. Each test will count for 20% of your course grade, and the Final Exam will count for 40% of your course grade.

Final Exam Date

Tuesday, December 8, 1:00 - 3:00p