STAT 971: Intro to Linear Stat Mod

2022 Spring

Lectures.

• M/W 1:45pm–3:15pm (On Zoom for the first two weeks, and then JMHH F38 starting from 01/24/2022)

Instructor. Anderson Ye Zhang (ayz@wharton.upenn.edu)

Office Hours: Tuesday 2-3pm (On Zoom for the first two weeks, and the in my office: 427 Academic Research Building)

Teaching Assistant. Yichen Wang (wangyc@wharton.upenn.edu)

Office Hours: Thursday 8-9pm (on Zoom for the first two weeks). You can also email Yichen to make appointments.

Course Website. https://canvas.upenn.edu/courses/1629137. Please check the Canvas site for announcements, assignments, solutions, and other course materials.

Course Overview. This is an advanced graduate course on mathematical statistics, following up on the course STAT 970. Despite its name, <u>this course is NOT about linear models</u>. Course prerequisite is STAT 970. Topic to be covered including:

1. Basics

- Stochastic convergence
- Delta method
- Concentration inequalities
- 2. Empirical Process
 - Uniform laws of large numbers: Rademacher complexity, VC dimension, symmetrization
 - Metric entropy: chaining, Dudley's integral entropy bound
- 3. Asymptotics / Lage-sample Theory
 - U-Statistics: projection
 - M-estimators: consistency, asymptotic normality, quadratic mean differentiability
 - Contiguity
 - Tests: asymptotic relative efficiency, local asymptotic normality
- 4. Other topics (TBD)

Textbook. Asymptotic Statistics, A.W. van der Vaart. Cambridge University Press, 1998. High-dimensional statistics: A non-asymptotic viewpoint, Martin J. Wainwright. Cambridge University Press, 2019.

Course Requirements and Grading Policy.

- Students are required to scribe lecture notes.
- There will be some problem sets, one final exam.
- Evaluation will be based on homework (40%), note scribe (30%), and final (30%).