STAT 714 Fall 2022 Class Schedule

Ray Bai

Overview of Linear Models

- **8/19/22**: syllabus and course overview
- **8/22/22**: examples of linear models

Review of Linear Algebra

- **8/24/22**: rank, linear independence, vector spaces
- **8/26/22**: Gram-Schmidt process, basis, column space and row space
- **8/29/22**: nonsingular matrices, rank-nullity theorem, systems of linear equations
- **8/31/22**: generalized inverses, eigenvalues, eigenvectors
- **9/2/22**: spectral decomposition theorem
- **9/5/22**: **Labor Day (no class)**
- **9/7/22**: quadratic forms, orthogonal projections
- **9/9/22**: orthogonal projections
- **9/12/22**: orthogonal decompositions
- **9/14/22**: orthogonal decompositions
- **9/16/22**: random vectors
- **9/19/22**: singular value decomposition
- **9/21/22**: singular value decomposition

Least Squares Estimation

- **9/23/22**: normal equations
- **9/26/22**: **Exam 1 (6:30-8:30 pm)**
- **9/28/22**: geometry of the least squares estimator
- **9/30/22**: **NO CLASS** (Hurricane Ian)
- **10/3/22**: orthogonal decomposition of least squares
- **10/5/22**: estimability and identifiability
- **10/7/22**: estimability
- **10/10/22**: estimability

Gauss-Markov and Aitken Models

- **10/12/22**: Gauss-Markov model and Gauss-Markov Theorem
- **10/14/22**: **Fall Break (no class)**
- **10/17/22**: Gauss-Markov model and Gauss-Markov Theorem
- **10/19/22**: Aitken's generalized least squares
- **10/21/22**: Aitken's generalized least squares

Distributional Theory

- **10/24/22**: multivariate normal distribution
- **10/26/22**: **Exam 2 (6:30-8:30 pm)**
- **10/28/22**: multivariate normal distribution
- **10/31/22**: distributions of quadratic forms
- **11/2/22**: Cochran's Theorem, maximum likelihood estimation

Inference in the Linear Model

- **11/4/22**: confidence intervals, t-tests, prediction intervals
- **11/7/22**: F-test
- **11/9/22**: F-test, stochastic dominance
- **11/11/22**: F-test, stochastic dominance
- **11/14/22**: F-test for general linear hypotheses
- **11/16/22 (Pt I)**: likelihood ratio test

Shrinkage Methods for Linear Regression

- **11/16/22 (Pt II)**: bias-variance trade-off
- **11/18/22**: centering and scaling, ridge regression
- **11/21/22**: ridge regression, subdifferential Calculus
- **11/23/22**: **Thanksgiving holiday (no class)**
- **11/25/22**: **Thanksgiving holiday (no class)**
- **11/28/22**: lasso regression
- **11/30/22**: lasso regression, coordinate descent algorithm
- **12/2/22**: coordinate descent algorithm for lasso
- **12/7/22**: **Final Exam (12:00-3:00 pm)**