UCLA Department of Statistics

Stats 201C Advanced Modeling and Inference

Course site on CCLE: https://ccle.ucla.edu/course/view/17S-STATS201C-1.
Instructor: Qing Zhou (zhou@stat.ucla.edu), OH: Thursday 5-6 pm, MS 8979.
TA: Meihui Xie (meihuixie@ucla.edu), OH: 10am-12noon, MS 8938.
Prerequisite: Stats 200B and 201B (recommended).
Programming skills (R, C/C++, Matlab, etc.).

Grading

Final grades of this course consist of three parts:

1. Homework assignments (20%): Four to five homework assignments.
2. Midterm exam (30%): Open-book, date TBD.
3. Final paper (50%): due final exam week.

Topics

Introduction to advanced topics in statistical modeling and inference. The course covers two groups of topics:

- Statistical inference for incomplete data and hidden variable models;
- Sparse regularization for linear, generalized linear and graphical models.

The course also introduces some computational methods developed for these models and problems. Below is a tentative structure of the course:

1. Incomplete data and the EM algorithm: Assumptions of missing data, EM and its properties, incomplete multivariate normal data.
2. Hidden variable models: Mixture modeling, EM clustering, stochastic block models for network data, variational EM.
3. Sparse linear and generalized linear models: Lasso, group lasso, high-dimensional inference, de-biased lasso, estimator augmentation.
4. Sparse graphical modeling: Gaussian graphic models, covariance selection, structure estimation of directed acyclic graphs, causal inference with intervention.

References

- Lecture notes: Will be posted on the CCLE site weekly.
- Schafer, J.L., Analysis of incomplete multivariate data (First edition, 1997).
- Hastie, T., Tibshirani, R. and Wainwright, M., Statistical Learning with Sparsity (2015).