Stat535a - Convex Optimization

2020-21 Winter T2

Instructor:
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Purpose:
This course focuses on algorithms for solving convex optimization problems and the implications for statistical estimation.

Prerequisites:
linear algebra (vectors, matrices, inverse, eigenvalues/decompositions, positive (semi)definiteness)
multivariable calculus (gradient, hessian)
undergraduate statistics (basic estimation and inference, linear regression, probability theory)
R/Python (loops and flow control, functions)

Resources:

Boyd, S. & Vandenberghe, L. (2004). *Convex Optimization*. Cambridge University Press.

Topics:

1. convex sets and functions
2. canonical problems
3. first order numeric optimization
4. Duality and KKT conditions
5. Glimpse of 0th/2nd order methods
6. Coordinate descent, ADMM
7. Path algorithms and regularized statistical models

Content:

Lectures and homeworks will focus on both mathematical understanding and coding techniques.