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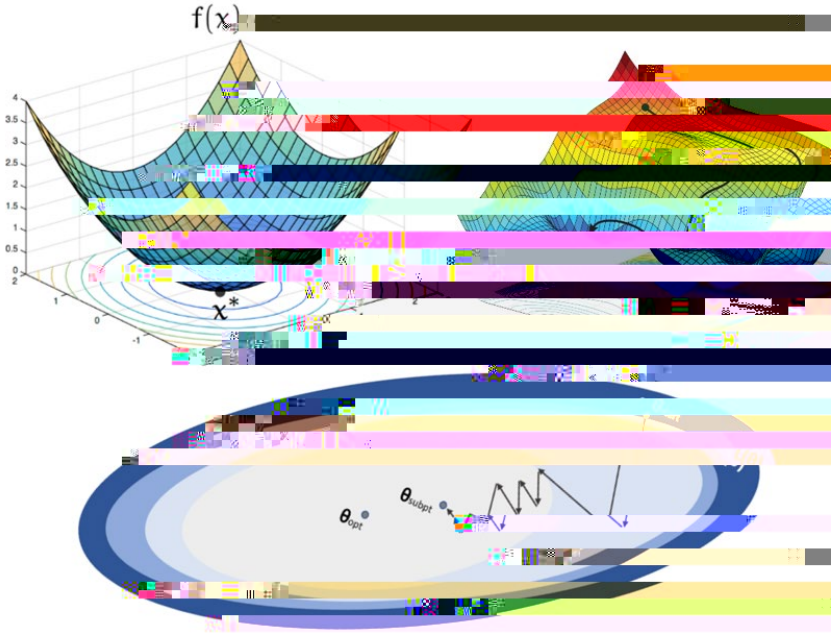
ELEN 4550/EECE 5550 FALL 2021
Developmentsin Signal Processing:
Optimization for Engineers TTh 9:30 - 10:45



Optimization theory and methods are a foundation to many areas in modern science and engineering, e.g.,machine learning.

Optimization is about achieving the "best result" given an objective and a set of constraints. Optimization problems can be found in communications, signal processing, power, transportation, andmany other areas.

In this course, we will learn thetheory and methodsof convex optimization, including the basic concepts, optimization problems, optimization algorithms, and applications. In the course project, you may either find an optimization problem or choose an applicationand formulate a problem, and use an optimization tool (CVX) to solve the problemin MATLAB .

Prerequisites:
Linear Algebra, Introduction-level Algorithms, Probability

Textbook:
"Convex Optimization", Cambridge University Press, 2004

Instructor:
Dr. Jie Gao, Electrical andComputer Engineering,
Marquette University

COURSE CONTENT

- Convex Sets
- Convex Functions
- Linear Programming
- Quadratic Programming
- Semidefinite Programming
- Optimality Conditions
- Duality Theory
- Unconstrained Optimization
- Interior-Point Methods
- Engineering Applications

PROJECT INFORMATION

- Project Steps:
  - Study an optimization method or algorithm
  - Simulate and solve a problem using optimization tools
- Project Delivery
  - Presentation
  - Short report
- Project Topics
  - From the textbook
  - From a research work
  - Propose your own topic