Convex Optimization in SPCOM

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Mathematical Optimization/Programming

A tool for solving quantitative problems in engineering, economics, biology, physics, and finance.

Mathematical Optimization/Programming

Express a real-world problem as an optimization model

- an objective or a goal
- decision or design variables
- constraints or restrictions

Goals

- Appreciate the role of convexity in optimization theory

- Learn to formulate problems in SP, COM, as optimization problems

- Watershed between easy and hard problems

- How seemingly hard problems can sometimes be easy

- General approaches to solve these problems approximately

Pre-requisites

- Linear Algebra

- bit of Probability

References:

Text book:

Stephen Boyd and Lieven Vandenberghe,

Convex Optimization,

Cambridge University Press.

http://www.stanford.edu/~boyd/cvxbook/

Video Lectures by Boyd: https://www.youtube.com/watch?v=McLq1hEq3UY&list=PL3940DD956CDF0622

Marks Distribution

Component	Total weightage
Assignments	20%
Mini-quizzes	30%
Attendance in Discussions	10%
Endsem Exam (online)	40%

Key course policies

- Course participation policy: participate in all components of the course;
  - if you miss a quiz/exam/project deadline, email me asap with the reason. Missing components of the course without any reason will result in F grade.

- Cheating Policy: Do not cheat in quiz/exams.
  - If I find out that you have cheated, you will get an F grade. You are not allowed to consult your notes/books/internet during the exam/quiz.

- Assignment Policy: when solving assignments:
  - You may discuss with your friends about how to solve
  - But solution must be your own, not copied. Copying in assignments will lead to F grade
  - To encourage you to attempt questions on your own and not consult internet, I will not penalize any mistakes in assignments

- Internet Policy: You must have good internet connectivity to give the quizzes/exams. At the very least, it should be able to support video over zoom.

How to get the most from this course?

- Time spend on a video = 2 x duration of video

- Sit with pen & paper, pause and rewind often

- Read Boyd's book to go beyond the notes

- Do not look up the solutions to assignment problems on the Internet, solve them yourselves, discuss with friends, discuss with me, and post your queries on the forum

- Might need to spend 2-3 days/week on this course