Optimization Theory and Algorithm II

Lecture 1: Introduction

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Introduction

Associate Professor

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Xi'an Jiaotong University (XJTU)
China

Email

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Employment Experience

- 2018.12-Present, Visiting Associate Professor (Full time position)
  Department of Industrial & Systems Engineering, University of Washington, Seattle.
- 2016.01-2016.02, Research Associate
  Deparmet of Mathematics, City University of Hong Kong
- 2015.04-2016.04, Visiting Asistant Professor
  Department of Business Statistics and Econometrics, Guanghua School of Management, Peking University

Education

- 2013-2014, Ph.D., Applied Math, XJTU, China
- 2010-2012, Visiting Ph.D. Student, Statistics, UC Berkeley, U.S.
- 2009-2010, Ph.D. Candidate, Applied Math, XJTU, China
- 2008-2009, M.S., Applied Math, XJTU, China
- 2003-2007, B.S., Applied Math, XJTU, China

Research Interests

- Statistics & Machine Learning
- Business Data Science

http://xiangyuchang.github.io/

SOM-XJTU

Optimization Theory and Algorithm II

Fall 2022

HOME SCHEDULE LECTURES ASSIGNMENTS PROJECT MATERIALS

Optimization Theory and Algorithm II / Fall 2022

Updates

- New course in Fall 2022 is comming soon.
- New Lecture is up: Lecture 1 Introduction and Review I [slides] [notes]

Course Description

This course is to present the basic theories and algorithms in optimization fields for undergraduate students at School of Management, Xi'an Jiaotong University. The aim is to give students a thorough understanding of how to constructe algorithms for solving optimization problems, and how to develop theories to analyze optimization problems and corresponding algorithms.

https://som-course.github.io/opt-fall-2022/

Optimization is a special field that is built on three interwined pillars:

- **Models** give rise to optimization problems.
- **Algorithms** solve optimization problems.
- **Theoretical foundations** support algorithms and models.

Optimization = Modeling + Algorithm + Theory

Location: B103 Main Building (主楼B103)

Date: 1st&2nd class, Mondays and 9&10th class, Thursdays, 09/05 - 10/24, 2022.

Instructors

Xiangyu Chang

Yao Wang

Teaching Assistants

Hao Di

Outline

32hrs, 1-8 week

Part I: Constrained Optimization

- Review
- Linear Programing
- Simplex Method
- Interior Point Method
- Projected Gradient Descent
- Mirror Descent

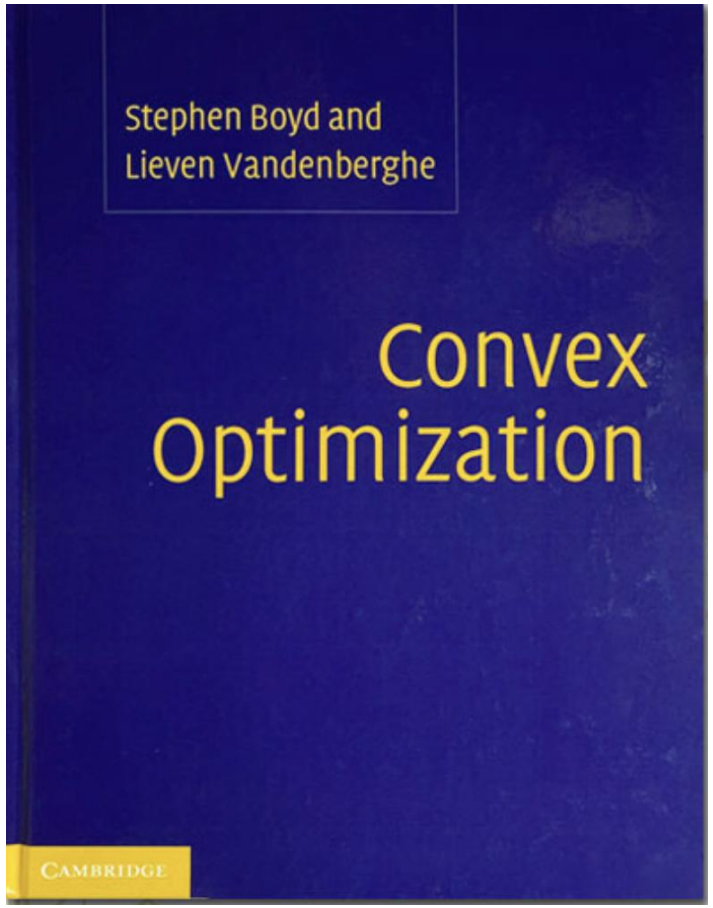
Part II: Advanced Topics

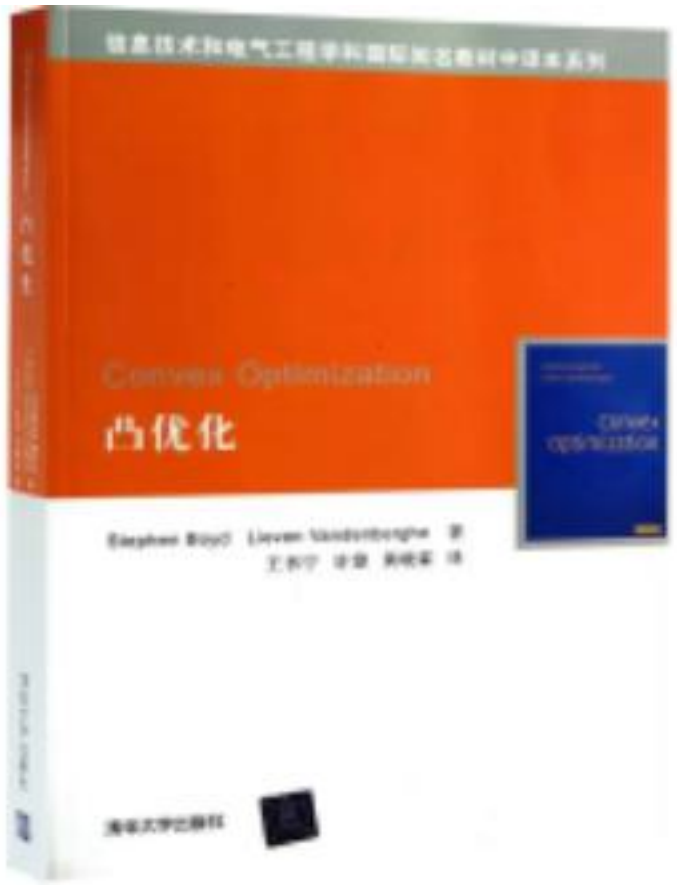
- Stochastic Gradient Descent
- SVRG
- Local SGD
- BCD
- ADMM

Evaluation

- 50%HW + 50%Final Exam = 100%
- Edit your homeworks by LaTeX!
- To practice Python or R for handling optimization problems

Text Book


Stephen Boyd and
Lieven Vandenberghe
Convex
Optimization
CAMBRIDGE


Convex Optimization
凸优化

最优化：建模、
算法与理论

Materials

Suggested Text Book

- Convex Optimization by Stephen Boyd and Lieven Vandenberghe: a very famous book.
- 最优化：建模、算法与理论 by 刘浩洋、户将、李勇锋、文再文编著.

R

- R
- RStudio: Suggested IDE
- R Cheatsheet
- An introduction course of R by Xiangyu Chang: Lecture 1, Lecture 2, Lecture 3, Lecture 4, Lecture 5, Lecture 6

Python

- Python for Beginners
- Python Cheatsheet
- Python 数据科学实践 by 常象宇，曾智亿，李春艳，程茜著
- SciPy Tutorial
- NumPy Quickstart Tutorial

LaTeX

- MacTeX
- CTeX
- Learn LaTeX in 30 minutes
- Use Overleaf
- TeXStudio: Suggested IDE

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Lectures

You can download the lectures here. We will try to upload lectures prior to their corresponding classes.

Lecture 1 Introduction and Review I

tl;dr: introduction lecture

[slides] [notes]

Suggested Readings:

- Lecture Notes

课后复习用，每次课结束后公布

课前预习用，每次课之前公布

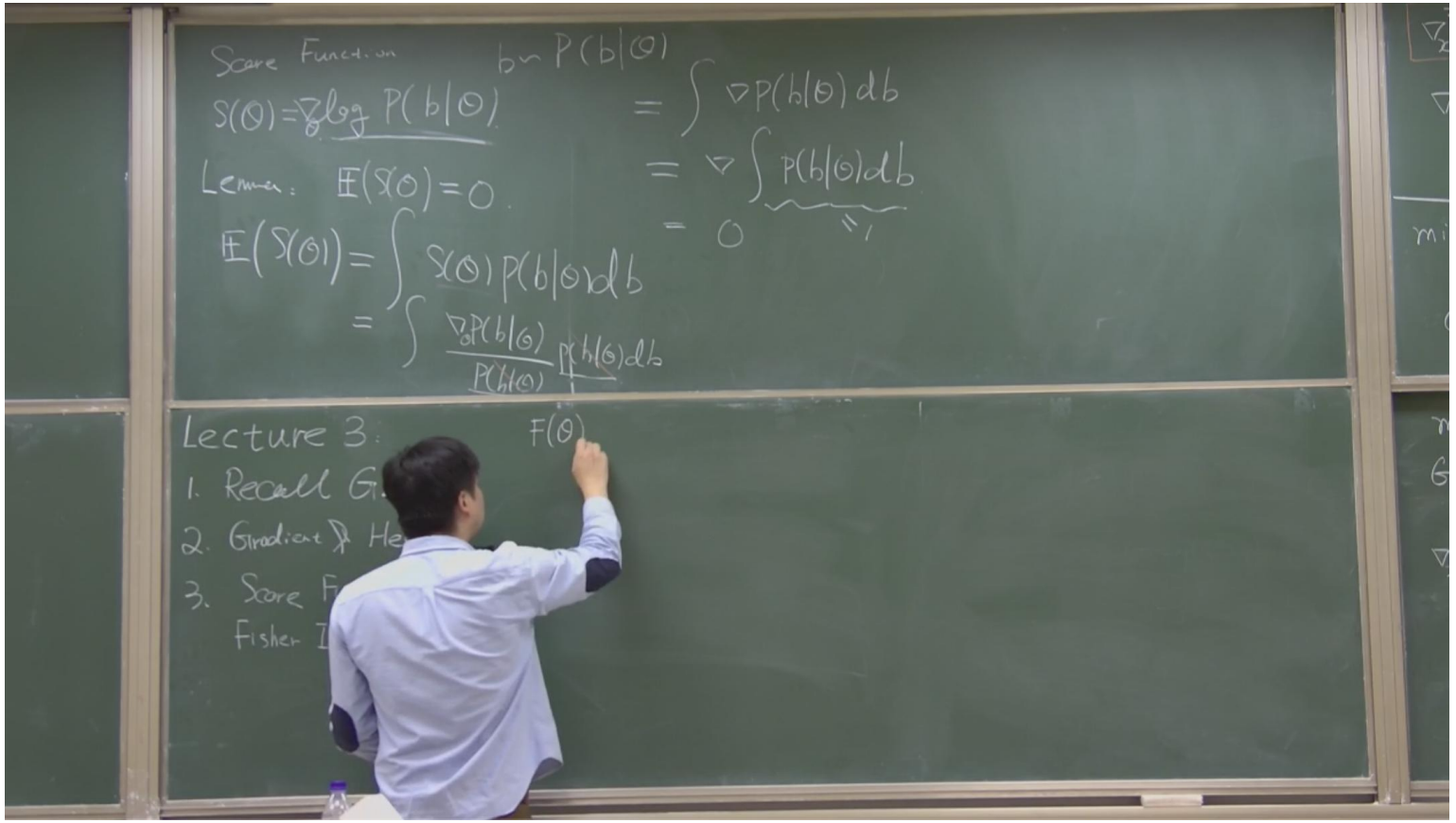
Assignments

You can download the assignments here. Also check out each assignment page for any additional info.

Schedule

EVENT	DATE	DESCRIPTION	COURSE MATERIAL
Lecture	09/04/2022 Sunday	Lecture 1 Introduction and Review I [slides] [notes]	**Suggested Readings:** ○ Lecture Notes

Teaching Style



- Writing on the blackboard in English for main lectures, Speaking in Chinese

- Demostraing codes or visual examples by sildes

Why?

手机人民网 m.people.cn | 观点 > 人民网评

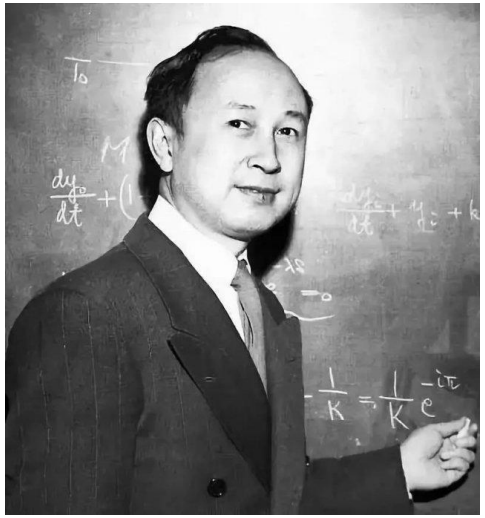
人民网评：一流大学建设要坚持社会主义办学方向

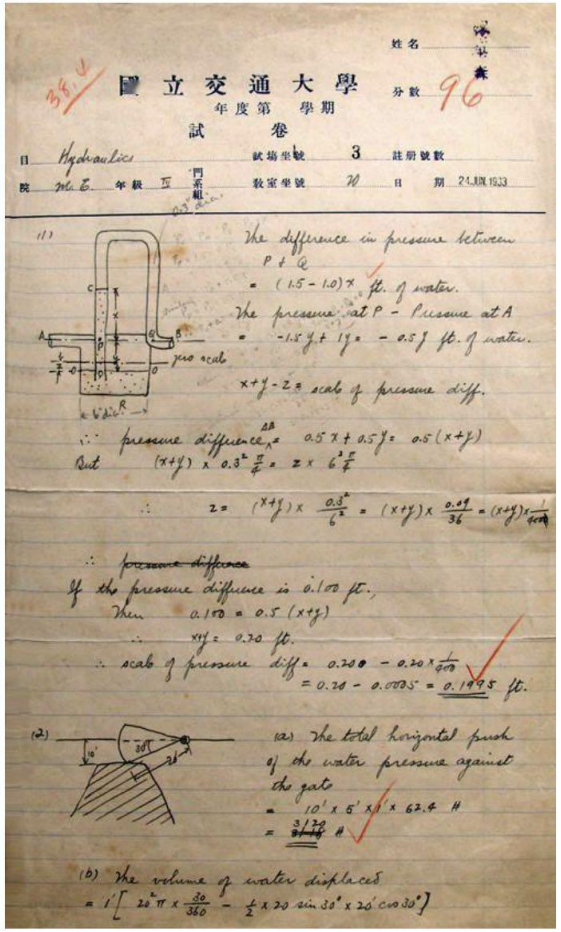
2021-04-22 08:07 人民网-观点频道 作者：岚山

文章指出，教育兴则国家兴，教育强则国家强。在国家发展进程中**办好高等教育，办出世界一流大学，首先要在体现中国特色上下功夫。**

交通大学上海徐家汇校区老校门（1920年代）

1956年交通大学主体西迁西安兴庆宫





Questions

RUSSIAN

SPANISH

FRENCH

VIETNAMESE

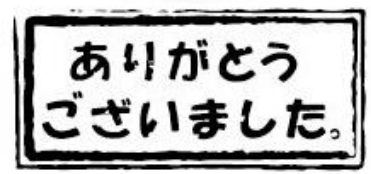
CHINESE

ENGLISH

GREEK

ARABIC

KOREAN



JAPANESE