

National Cheng Kung University

Modular Course 2021 Summer Program

實用線性規劃理論與應用

Practical Linear Programming Theory and Applications

Instructor

Affiliation

Graduation (Ph.d.)

許瑞麟

NCKU Math

North Carolina State University

Course Type

Course
Credit

Student Size
(Maximum)

Lecture
+
Recitation

1

35

若因 COVID-19 疫情導致無法實體授課，本課程改以線上授課。

Student Background

Students from all college are welcome

Difficulty

Challenging Medium Well Medium Entry Level (Basic)

Format of The Course

Lecture 80% , Practice 20% (including in-class exams and computer laboratory recitation)

Grading Policy

In class exam 40 % 、 Report 40% 、 Participation 20%

Note:

Attendance is required. On Day 2, 3, 4, 5, there will be in-class quizzes (4 in total, each for 50 minutes) before a new lecture is given.

The report should be submitted to Moodle system one week after the class ends. It should include two parts: (i) summary of the technical essence taught in class and (ii) your review and thoughts of the class.

Code of Conduct for The Course

None

Course Description

Linear programming has become an indispensable tool for computer scientists; statisticians; managers; and many others who want to model their problems or applications in a mathematical way. While a comprehensive treatment to the entire theory of linear programming could take up a whole semester having at least three credit hours, in this modular course we intentionally make it relatively concise by focusing more on the modeling aspect with applications. This does not mean that we can completely avoid mathematical theory and proofs. In particular, we feel that it is necessary for students to understand the duality theorem with proofs. Interesting and practical applications, including the data classification, workshop scheduling, network flows; error code correction; and classical zero-sum games will be covered.

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Timetable and Syllabus

Peroid	Timetable	Syllabus
8/2(MON)	9:00-12:40	Modeling with linear programming. (The Diet Problems; Network Flow problem; Machine Scheduling; Data Classification; Packing Problems; Error Code Correction upper bound estimations)
8/3(TUE)	9:00-12:40	(cont'd) Modeling with linear programming. (The Diet Problems; Network Flow problem; Machine Scheduling; Data Classification; Packing Problems; Error Code Correction upper bound estimations) Programming and Running linear programming on NEOS.
8/4(WED)	9:00-12:40	Farkas Lemma and LP Duality
8/5THU)	9:00-12:40	Farkas Lemma and LP Duality
8/6(FRI)	9:00-12:40	Zero-sum game and Nash Equilibrium

Goal of the Course

- 1.Learn how to formulate real life problems into an optimization mathematical model
- 2.Be familiar with duality theorem and its proof
- 3.Study and understand important applications of linear programming

The Importance, Cross-Over Disciplinary and Contemporary of The Curriculum

This is an era of data sciences. Linear Programming is one of the most fundamental mathematical models for the real world applications. Many advanced modeling tools rely more or less on linear programming. Learning and using linear programming is critical for students to become contemporary and stay competent.

Remarks

Textbook :

Course Slide will be uploaded before classes begin