

NATIONAL UNIVERSITY OF SINGAPORE
School of Business
Department of Decision Sciences

DSC3214-Introduction to Optimisation

Lecturer : Prof Melvyn Sim
Time : 3 hours weekly

Prerequisites

This module assumes prior knowledge of multi-dimensional calculus and linear algebra and certain maturity in mathematics. Basic proficiency with *Microsoft Excel* will be assumed.

Course Objective

This module introduces students to the theory and applications of modern optimization techniques. Formulation and modeling of real life optimization problems via sophisticated software tools will be emphasized to strengthen students' understanding of various fields in optimization. Throughout the course, references will be made wherever appropriate, to business applications, such as portfolio selection and others. Students who are interested in computer and quantitative approaches in business will learn many useful techniques in large business system management from this course.

Learning Outcomes

The module provides students an overview of the most commonly used algorithms in solving real-life optimization problems. After this module, students should be able to gain an overall knowledge of what optimization is, model some standard optimization problems, design algorithms to solve some optimization problems using different approaches, and solve optimization problems using Julia.

Course Outline

- Introduction to Optimization
- Linear Optimization Models
- Optimization Software: Julia
- Geometry of Linear Optimization
- Sensitivity Analysis and Duality
- Network Optimization
- Discrete Optimization
- Quadratic Optimization
- Stochastic Optimization
- Robust Optimization

References

- Lecture notes provided will be sufficient.

Assessment

- Class participation & Homework (20%)
- Group project and presentation (40%)
- Final Exam (40%)