FE 501
Optimization Models in Economics and Finance

Fall 2022

Course Description

This course is aimed to provide an overview of optimization concepts with emphasis on financial modeling and decision making. The topics that will be covered are:

- Linear Programming (LP): Formulation of LP models, solution of LP models, applications in finance and economics
- Integer Linear Programming (ILP): Formulation of ILP models, solution of ILP models, applications in finance and economics
- Nonlinear Programming (NLP): Formulation of NLP models, solution of NLP models, applications in finance and economics
- Dynamic Programming (DP): Formulation of DP models, solution of DP models, applications in finance and economics

Course Outline

Week 1. Introduction.
Week 2. Linear Programming: Formulation, Graphical Solution Procedure, Simplex Method, Excel-Solver; GAMS Optimization Package
Week 3. Linear Programming: Applications to Finance and Economics
Week 4. Duality and Sensitivity
Week 5. Integer Linear Programming: Formulation, Branch-and-Bound method
Week 6. Integer Linear Programming: Applications to Finance and Economics
Week 7. Nonlinear Optimization: Formulation of unconstrained and constrained NLP models, Solution methods, KKT conditions
Week 8. Nonlinear Optimization: Formulation of unconstrained and constrained models, Solution methods, KKT conditions
Week 9. Quadratic Programming and Portfolio Optimization
Week 10. Techniques for Calculating the Efficient Frontier.
Week 11. Dynamic Programming: Formulation of DP models, solution of DP models,
Week 12. Dynamic Programming: Applications to Finance and Economics
Week 13. Summary

Instructor: Necati aras, arasn@boun.edu.tr

Textbook: Optimization Methods in Finance, 2nd Edition, Cornuéjols G., Pena, J, and Tütüncü R., Cambridge University Press, 2018.

Grading: Midterm1 (30%), Midterm 2 (30%), Final (40%)