Technical University of Munich   **SS 2017**
Center for Energy Markets
Adriana Kiszka
Goncalo Terca

Modeling and Optimization in Energy Markets

Course Type	Lectures/Exercises
Course Level	Master
ECTS/SWS	6/4
Lecturers	Adriana Kiszka, Goncalo Terca
Language	English

General information

The course is an introduction to modeling and optimization in the energy markets. During this course, students will learn how to use Matlab and solve some optimization problems using this tool. Furthermore they will have the opportunity to understand optimization theory and the basics of financial mathematics used in the energy markets. Additionally, some applications will be presented and analyzed, while giving an overview of possible future research topics.

This course comes as a lead-in for the course *Topics in Energy Trading*, but it is also recommended to students willing to write a Master's thesis in the Center for Energy Markets.

Participation & Registration

The course is open to all Master's students of the TUM School of Management/Mathematics. The number of participants is limited to 30 and a registration is required. Registration is done via TUMonline. Seats are awarded on a *first-come-first-serve* basis.

Assessment & Grading

The examination consists of presentations of the results obtained for the case studies, including two short written reports and in-class presentations containing a discussion of the cases. The reports are a means to assess the students' understanding of theories and methods, their ability to apply them to real world problems, and to implement their solution using a programming language. The presentations measure the students' ability to structure and present their results, connect them with state-of-the-art methods and theories, and present them in a scientific way. The students' reaction to questions and their critical analysis of their work reflect their ability to defend the results obtained based on rigorous scientific reasoning.

Organization

This course is going to be structured as an intensive course, consisting of 12 sessions and organized as follows:

1. Introduction to Matlab

   - Basics of the Matlab language (Goncalo Terca, 24.04.2017, $9 - 12$)

- Tool for model building and statistics (Goncalo Terca, 24.04.2017, $13 - 16$)

2. Introduction to optimization

   - Overview (Goncalo Terca, 27.04.2017, $9 - 12$)
   - Solving linear programming problems with Matlab (Goncalo Terca, 27.04.2017, $13 - 16$)
   - Dualization (Goncalo Terca, 04.05.2017, $9 - 12$)

3. Introduction to finance

   - Basics of the finance (Adriana Kiszka, 04.05.2017, $13 - 16$)
   - Advanced financial mathematics (Adriana Kiszka, 08.05.2017, $9 - 16$)

4. Applications

   - Storage problem (Adriana Kiszka, 11.05.2017, $9 - 12$)
   - Plant problem (Adriana Kiszka, 11.05.2017, $13 - 16$)

5. Presentations

   - Case study 1 (05.06.2017, $9 - 12$)
   - Case study 2 (26.06.2017, $9 - 12$)