COMP331/COMP557: Optimisation

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University of Liverpool

Sept–Dec 2019 (1st semester)

Material passed down from Martin Gairing (University of Liverpool), based on a course by Martin Skutella at TU Berlin
Christian Ikenmeyer

- 2002–2008 (Paderborn University, Germany)
  MSc in mathematics and MSc in computer science
- 2008–2012 (Paderborn University, Germany)
  PhD in mathematics
- 2013–2016: (Texas A&M University, USA)
  Visiting assistant professor
- 2017–2019 (Max Planck Institute for Informatics, Germany)
  Senior Researcher
- 2019–2019 (Max Planck Institute for Software Systems, Germany)
  Research Group Leader
- Since 2019 (Liverpool University)
  Senior Lecturer
Administrative Details

Lectures:
- Mondays, 11:00 – 12:00
- Thursdays, 16:00 – 17:00
- Fridays, 11:00 – 12:00

Tutorials:
- Flávia Alves (F.Alves@liverpool.ac.uk)
- starting from Monday 23 September

Assessment:
- 25 % continuous assessment
- 75 % final exam
The webpage for this module

- [http://pcwww.liv.ac.uk/~iken/teaching/optimisation/](http://pcwww.liv.ac.uk/~iken/teaching/optimisation/)
- lecture notes
- resources
- announcements
Course Aims

▶ To provide a foundation for modelling various continuous and discrete optimisation problems.

▶ To provide the tools and paradigms for the design and analysis of algorithms for continuous and discrete optimisation problems. Apply these tools to real-world problems.

▶ To review the links and interconnections between optimisation and computational complexity theory.

▶ To provide an in-depth, systematic and critical understanding of selected significant topics at the intersection of optimisation, algorithms and (to a lesser extent) complexity theory, together with the related research issues.
Learning Outcomes

Upon completion of the module you should have:

▶ A critical awareness of current problems and research issues in the field of optimisation.
▶ The ability to formulate optimisation models for the purpose of modelling particular applications.
▶ The ability to use appropriate algorithmic paradigms and techniques in context of a particular optimisation model.
▶ The ability to read, understand and communicate research literature in the field of optimisation.
▶ The ability to recognise potential research opportunities and research directions.
Outline

- Introduction
- Linear programming and the simplex algorithm
- Geometric interpretation of the simplex algorithm
- Duality theory
- Optimisation in practise