MAI0008 Nonlinear optimization, equations and least squares

This course is given every year since 2000. It is recommended by LiTH Forskarutbildningsnämnden as "Fakultetsgemensamma forskarutbildningskursen". The course starts on January 16, 2019, and it will take about 16-17 weeks (one seminar per week on Wednesdays 15-17). Each topic is covered twice - first by the lecturer, then at the next meeting by a couple of students. Their presentation is followed by discussions.

The main topics:

- unconstrained optimization,
- constrained optimization,
- systems of simultaneous nonlinear equations,
- nonlinear least squares.

Students will get acquaintance with the most effective numerical methods in nonlinear optimization, equations and least squares, many of which have been developed only in recent years. The course responds to the growing interest in optimization in engineering, science, and business by focusing on the methods that are best suited to practical problems.

Students background - basic courses in:

- calculus,
- numerical linear algebra,
- optimization.

Any gap in the background can be closed by students at the beginning of the course by intensive self-study with a help of the lecturer.

Useful optimization links:

NEOS Optimization Guide
Optimization Online, the latest and greatest eprints on optimization
Computational Infrastructure for Operations Research COIN
Decision Tree for Optimization Software
Mathematical Programming Glossary
OR-exchange
Convex Optimization
Effective writing

The basic book is:

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