



KURSPLAN

Linjär algebra och optimering, 9 högskolepoäng

Linear Algebra and Optimization, 9 credits

Kurskod:	TAOG17	Utbildningsnivå:	Grundnivå
Fastställd av:	VD <VÄRDE SAKNAS>	Utbildningsområde:	Naturvetenskapliga området
Gäller fr.o.m.:	2017-01-01	Ämnesgrupp:	MA1
Version:	1	Fördjupning:	G1N
Diarienummer:	JTH 2016/2672-313		

Lärandemål

After a successful course, the student shall

Kunskap och förståelse

- display knowledge of vectors and matrices and the basic operations, defined for these objects
- display knowledge of systems of simultaneous linear equations, their possible sets of solution, and how they can be formulated as matrix equations
- display knowledge of what constitutes a linear programming problem

Färdighet och förmåga

- demonstrate the ability to use Gauss elimination and basic matrix algebra to solve systems of linear equations
- demonstrate the ability to use vector operations to solve geometrical problems in two or three dimensions
- demonstrate the ability to calculate determinants and use them to draw conclusions on the solution set of a system of simultaneous linear equations, matrix singularity or linear dependency of vectors
- demonstrate the ability to mathematically formulate a real world problem as a linear programming problem
- demonstrate the ability to use graphs and the Simplex algorithm to solve limited-sized linear programming problems and to draw sensitivity conclusions from the solutions
- demonstrate the ability to formulate the dual of a linear programming problem and to draw conclusions from its solution
- demonstrate the ability to use computer software to solve optimization problems

Innehåll

The course introduces several elements from the linear algebra as well as techniques for linear optimization.

The course includes the following elements:

- Systems of simultaneous linear equations and Gauss elimination

- Vectors including the basic operations and some vector geometry
- Matrices and matrix algebra
- Eigenvectors and eigenvalues
- Linear programming
- Graphical solutions to two-dimensional linear programming problems
- The simplex method and sensitivity analysis
- Duality in linear programming
- Examples of computer software for optimization

Undervisningsformer

Lectures, seminars and computer exercises.

Undervisningen bedrivs på engelska.

Förkunskapskrav

Grundläggande behörighet samt Engelska 6, Fysik 1, Kemi 1, Matematik 3c. Eller: Engelska B, Fysik A, Kemi A, Matematik D (eller motsvarande kunskaper).

Examination och betyg

Kursen bedöms med betygen 5, 4, 3 eller Underkänd.

Poängregistrering av examinationen för kursen sker enligt följande system:

Examinationsmoment	Omfattning	Betyg
Skriftlig tentamen ¹	8 hp	5/4/3/U
Laborationer	1 hp	U/G

¹ Bestämmer kursens slutbetyg vilket utfärdas först när samtliga moment godkänts.

Kurslitteratur

The literature list for the course will be provided one month before the course starts.

Hardy: Linear algebra for engineers and scientists using Matlab, Pearson, ISBN 0-13-010988-6