Advanced Numerical Linear Algebra

Sommersemester 2025

Content: This lecture contains a few selected topics in numerical linear algebra that exceed solving linear systems and finding eigenvalues. One focus are matrix equations, mostly linear but also one very relevant quadratic one. We show examples solution theory and discuss algorithms to solve them. Another big topic are matrix functions, this will also be introduced with definitions and examples and several solutions algorithms discussed and derived. Further topics include Randomized Numerical Linear Algebra and selected topics in Multilinear Numerical Linear Algebra. The topic gives you insight in very widely used algorithms and in particular how clever algorithms can outbeat compute power.

Target Group: This is a master course, however the only requirement necessary is Introduction to Numerical Linear Algebra or Scientific Computing or similar.

Thesis: Topics for a Bachelor- or Masterthesis can be dicussed at the end of the lecture.

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