universität wien

Fakultät für Mathematik

Mathematisches Kolloquium

Mittwoch, 8.November 2017
HS 16

EINLADUNG

D. Russell Luke
(Universität Göttingen)

"Quantifying convergence of Picard iterations"

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Abstract:
It can be observed in many applications that algorithms converge unexpectedly well, despite any theory to explain their success. An analysis of algorithm complexity in terms of function values is wide-spread and can be applied readily in many practical instances. However, this strategy of analysis cannot explain the observed convergence to stationary points of iterates in many cases, nor can it yield error estimates on the distance to locally optimal solutions as opposed to locally optimal values. We propose a framework for quantifiable local convergence analysis of iterations of expansive fixed point mappings. Application of the theory involves verifying two key properties of fixed point mappings near fixed points: almost nonexpansiveness (usually easy) and the existence of an error bound (usually hard). To demonstrate the theory, we prove for the first time a number of results showing local linear convergence of cyclic projections for (possibly) inconsistent feasibility problems, local linear convergence of the forward-backward algorithm for structured optimization without convexity, strong or otherwise, and local linear convergence of a nonconvex application of the Douglas–Rachford algorithm for minimization. Known results, convex and nonconvex, are recovered in this framework. Concrete application to inverse problems in x-ray imaging and sub-diffraction florescence mircroscopy are presented.

15.45 Uhr: Kaffeejause
16.15 Uhr: Vortrag

vinum cum pane im Anschluss

Radu Bot
Christian Krattenthaler