universität wien
Fakultät für Mathematik

ANTRITTSVORLESUNG

Mathematisches Kolloquium

Mittwoch, 20. Oktober 2021
Sky Lounge

EINLADUNG

Vladimir Kazeev
(Universität Wien)

„Low-rank tensor refinement for the data-driven solution of PDEs“

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Abstract:
The approximation of complex data in suitable low-dimensional subspaces is fundamental to scientific computing and data science: it allows for exposing the hidden structure of data, for exploiting this structure computationally by operating with relatively few parameters and, possibly, for analyzing the data by interpreting those parameters. In the context of PDEs, much of the work of numerical analysts traditionally consists in designing — by hand — efficient approximation subspaces for specific classes of problems. In this talk, we will discuss a modern approach based on tensor networks, which is aimed at approximating solutions in subspaces computed adaptively from the data at hand and «online», as opposed to those constructed in any «offline» fashion (for example, analytically or by massive precomputation).
Starting with the adaptive low-rank approximation of matrices, we will discuss how it generalizes to higher-dimensional arrays and to functions, leading to efficient numerical methods for PDEs. We will see what issues arise in the design, analysis and implementation of low-rank tensor approximations and algorithms and how these aspects rest on the long-standing traditions of the fields of analysis, approximation theory, numerical analysis, numerical linear algebra and scientific computing.

15.45 Uhr: Kaffeejause

16.15 Uhr: Vortrag

Kleines Buffet im Anschluss

Radu Ioan Bot