Donnerstag, den 23. April 2026, um 14:30 Uhr, im Hörsaal 6

Prof. Dr. Holger Wendland*
(Universität Bayreuth, LS für Angewandte und Numerische Analysis)

Multiscale Radial Basis Functions for Learning from Scattered Data

Zusammenfassung/Abstract:

Radial basis functions (RBFs) represent a popular kernel-based method for learning functions from scattered data. They are used in various areas comprising, for example, multivariate approximation, computer graphics, machine learning, aeroelasticity and the geosciences.

The approximation space is usually formed using the shifts of a fixed basis function. This simple approach makes it easy to construct approximation spaces of arbitrary smoothness and in arbitrary dimensions.

Multiscale RBFs employ radial basis functions with compact support. In contrast to classical RBFs they do not only use the shifts of a fixed basis function but also vary the support radius in an orderly fashion. If done correctly, this leads to an extremely versatile and efficient approximation method.

In this talk, I will introduce the basic ideas of multiscale RBFs, I will give and analyse an explicit algorithm for the approximation of multivariate functions from scattered data. After that, I will discuss more recent results on the topic, for example, new representations of the underlying basis, how multiscale RBFs can be used for data compression and for the resolution of different scales in the target function.

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