



Oberseminar Mathematische Strömungsmechanik

Institut für Mathematik der Julius-Maximilians-Universität Würzburg

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A new variable shape parameter strategy for radial basis function approximation using neural networks

Abstract:

The choice of the shape parameter highly affects the behaviour of radial basis function (RBF) approximations, as it needs to be selected to balance between ill-condition of the interpolation matrix and high accuracy. In this paper, we demonstrate how to use neural networks to determine the shape parameters in RBFs. In particular, we construct a multilayer perceptron trained using an unsupervised learning strategy, and use it to predict shape parameters for inverse multiquadric and Gaussian kernels. We test the neural network approach in RBF interpolation tasks and in a RBF-finite difference method in one and two-space dimensions, demonstrating promising results. In the end of this talk, I will also talk about work in progress towards self-improving codes, in which a machine learning algorithm is integrated within a numerical solver, and improves over time by using local error estimators and online learning.

This is joint work with Fatemeh Nassajian Mojarrad, Jan S. Hesthaven and Philipp Öffner

room 40.03.003 (Emil Fischer Str. 40)

Tuesday, June 13 at 2:15 pm

Zu diesem Vortrag sind Sie herzlich eingeladen.

gez. Christian Klingenberg