Universität Hamburg
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Lothar Collatz Center
for Computing in Science

GRK 2583

Student Chapter Hamburg

Nachwuchsgruppe Hamburg

Lothar-Collatz-Seminar

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Function space summation-by-parts operators applied to hyperbolic conservation laws

Abstract:

Entropy stability is a foundation of numerical methods for hyperbolic conservation laws, thereby ensuring the stability and robustness of the resulting numerical solutions. Summation-by-parts (SBP) operators provide a general framework to systematically develop entropy-stable schemes by mimicking continuous properties on a discrete level. They have proven to be a powerful tool to provide stable and high-order accurate numerical solutions. Classically, they are developed in order to differentiate polynomials up to a certain degree exactly. However, in many cases alternative function spaces are more appropriate to approximate the underlying solution space. Especially in multidimensional problems with potentially complex domains radial basis functions are known to possess very good approximation properties. The theory of radial basis function approximation provides us with stability and convergence results for scattered data approximation in a meshfree setting.

This talk discusses properties and efficient construction algorithms for multidimensional function space SBP (MFSBP) operators based on scattered data. I focus on radial basis function spaces and show some preliminary results for using MFSBP operators to solve conservation laws.

For further information please contact

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www.c3s.uni-hamburg.de/news-events/seminar-c3s.html