Lothar-Collatz-Kolloquium für Angewandte Mathematik

Donnerstag, den 11. Januar 2024, um 17:15 Uhr, im Hörsaal 5

Dr. Jemma Shipton*
(University of Exeter, UK, Mathematics and Statistics)

"Compatible finite element methods for numerical weather prediction."

Zusammenfassung/Abstract:

Compatible finite element methods are a form of mixed finite element method (meaning that different finite element spaces are used for different fields) that allow the exact discrete representation of the standard vector calculus identities div-curl=0 and curl-grad=0. The popularity of these methods for numerical weather prediction is due to the flexibility to run on non-orthogonal grids, thus avoiding the communication bottleneck at the poles, while retaining the necessary convergence and wave propagation properties required for accuracy.

I will describe recent work on compatible finite element discretisations for both shallow water and compressible equation sets, including how we extend the system to include moist processes. This work has been carried out using Gusto, a dynamical core toolkit built on top of the Firedrake finite element library (see: https://www.firedrakeproject.org/gusto/).

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