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Computational Mathematics Seminar Series

Exploiting Approximation Properties in the Discontinuous Galerkin Scheme for Improved Trouble Cell Indication**Jennifer Ryan, University of East Anglia, Norwich, UK**

Senior Lecturer, Applied Mathematics

Digital Media Center 1034
February 02, 2016 - 03:30 pm**Abstract:**

In this talk, we present a generalized discussion of discontinuous Galerkin methods concentrating on a basic concept: exploiting the existing approximation properties. The discontinuous Galerkin method uses a piecewise polynomial approximation to the variational form of a PDE. It uses polynomials up to degree k for a $k+1$ order accurate scheme. Using this formulation, we concentrate on nonlinear hyperbolic equations and specifically discuss how to obtain better discontinuity detection during time integration by rewriting the approximation using a multi-wavelet decomposition. We demonstrate that this multi-wavelet expansion allows for more accurate detection of discontinuity locations. One advantage of using the multi-wavelet expansion is that it allows us to specifically relate the jumps in the DG solution and its derivatives to the multi-wavelet coefficients. This is joint work with Thea Vuik, TU Delft.

Speaker's Bio:

Jennifer Ryan is a Senior Lecturer in Applied Mathematics at the University of East Anglia, Norwich, United Kingdom. Her research interests lie in higher-order numerical methods for hyperbolic partial differential equations. Specifically, exploiting the underlying approximation properties for use in discontinuity detection and accuracy extraction. Her research focuses on both the mathematical aspects as well as computing and applications.

This lecture has a reception @ 03:00 pm