Department of Mathematics

University of Houston

Scientific Computing Seminar

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Adaptive hierarchical slope-limiting

Thursday, September 22, 2011 3:00 PM- 4:00 PM Room 646 PGH

Abstract: The presence of discontinuities in numerical solutions to hyperbolic PDEs has led to the development of a large number of "slope-limiting" strategies. These various slope-limiting strategies attempt to consistently stabilize a numerical solution while simultaneously minimizing the associated error in the method. We will present a family of dynamic-in-p adaptive slope-limiters (including limiters found in [1], [2], [3], [4] ...) in the context of a discontinuous Galerkin finite element method. We will show some comparative examples of these limiters over some scalar transport problems for both fixed polynomial order p as well as dynamically p-enriched spatially varying order p(x, t).

References

- 1. T. Barth and D.C. Jesperson. The design and application of upwind schemes and unstructured meshes. AIAA paper 89-0366, pages 1-12, 1989.
- 2. D. Kuzmin. A vertex-based hierarchical slope limiter for p-adaptive discontinuous Galerkin methods. J. Comput. Appl. Math., 233(12):3077-3085, 2010.
- Y. Liu, C.-W. Shu, E. Tadmor, and M. Zhang. Central discontinuous Galerkin methods on overlapping cells with a nonoscillatory hierarchical reconstruction. SIAM J. Numer. Anal., 45(6):2442-2467, 2007.
- J.B. Bell, C.N. Dawson, and G.R. Shubin. An unsplit, higher order Godunov method for scalar conservation laws in multiple dimensions. Journal of Computational Physics, 74(1):1-24, 1988.

This seminar is easily accessible to persons with disabilities. For more information or for assistance, please contact the Mathematics Department at 743-3500.