Applied Mathematics

McGill & CRM Applied Mathematics Seminar

2:35 pm Monday 17 November 2003
At McGill, Burnside Hall 1205

"An Overview of Several Types of Moving Grid Methods for Solving Higher Dimensional PDEs"

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Coffee and refreshments will be served after the seminar

Abstract: In the context of solving time-dependent PDEs, some basic moving mesh procedures will be discussed. We consider two basic types of these procedures, one which relies on minimizing a suitable variational form, and the other involves computing the mesh velocities directly. Both essentially involve finding a coordinate transformation from physical coordinates to computational coordinates, and each has a number of difficulties for the case of higher dimensional PDEs. Recent theoretical developments which help to both explain why these traditional difficulties occur and show how to overcome them are discussed. Numerical examples for physical problems such as ones having blowup solutions are given to demonstrate the efficacy of these new implmentations. Finally, we show how the moving mesh problem can be related to some other general problems in science and engineering.