Applied

Mathematics

McGill
Applied Mathematics Seminar Series
Feb. 8th, 2002

Dr. Yingjie Liu, SUNY at Stony Brook

Title: Conservative Interface Tracking Methods for Partial Differential Equations

Friday Feb 8, 2002

Time: 4:00 pm

Room: Burnside 1205

Abstract: Understanding and improving numerical methods for approximating solutions of partial differential equations (PDEs) is an economically and scientifically interesting area. From a mathematical point of view, these techniques provide powerful tools for studying the qualitative and quantitative behavior of partial differential equations (PDEs). Weak solutions of hyperbolic PDEs can contain discontinuities, and are often quite challenging to approximate well. The most successful high resolution finite difference (or finite volume) methods for capturing these singularities are usually based on Godunov's scheme and use a Van Leer type limiter. Such methods attempt to "capture" a discontinuity in a few mesh intervals, but in some situations this has not been completely satisfactory, e.g. multi-phase fluid flow. Level set and front tracking methods have been developed to track these discontinuities as interior boundaries. But they are not conservative across the interface. I will present a recently developed conservative front tracking method for hyperbolic conservation laws, and illustrate some numerical and theoretical results.

Dr. Liu is a candidate for a position in the department