



Applied Mathematics



McGill & CRM Applied Mathematics Seminar

2:35 pm Monday 3 November 2003

At McGill, Burnside Hall 1205

“A modified equations approach for multi-symplectic integration methods”

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Coffee and refreshments will be served before the seminar

Abstract: A useful method for understanding discretization error in the numerical solution of ODEs is to compare the system of ODEs with the modified equations, the equations solved by the numerical solution, which are obtained through backward error analysis. Using symplectic integration for Hamiltonian ODEs provides more insight into the modified equations. The ideas of symplectic integration are extended to Hamiltonian PDEs, such that the symplectic structure in both space and time is exactly preserved. This paves the way for the development of a local modified equation analysis solely as a useful diagnostic tool for the study of these types of discretizations. In particular, the modified equations are used to derive modified conservation laws of energy and momentum that are preserved to higher order along the numerical solution.

