PIMS / AMI Seminar

Friday, November 1, 2013
3:00 p.m.
CAB 657

"Variational integrators for rotating stratified fluids"

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Abstract

Recently, a new approach for the numerical discretization of the Euler equations of an ideal fluid has been developed. It is based on a spatial discretization of the group of volume preserving diffeomorphisms of the fluid's domain by means of a Lie group of orthogonal stochastic matrices. The temporal discretization is obtained via a variational integrator, in such a way that the final numerical scheme respects the geometry of the original equations. In particular, the scheme is symplectic and allows for a discrete version of Kelvin's circulation theorem.

In this talk, I will show how these new methods can be adapted to the case of geophysical fluid's equations such as the Boussinesq and primitive equations, or the rotating Euler equations on the sphere. I will then show that these integrators are well appropriate in ocean and atmospheric dynamics, by presenting the behavior of the scheme in elementary standard test cases such as geostrophic or hydrostatic adjustments.

Refreshments will be served in CAB 649 at 2:30 p.m.