

*Drexel University Partial Differential Equations
and Applied Mathematics Seminar*

PRESENTS:

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UC Berkeley

Computation of time-periodic solutions of nonlinear PDE

Abstract: I will describe a spectrally accurate numerical method for finding non-trivial time-periodic solutions of nonlinear PDE. We minimize a functional (of the initial condition and the period) that is positive unless the solution is periodic, in which case it is zero. We use adjoint methods (originally developed for shape optimization in fluid mechanics) to compute the gradient of this functional with respect to the initial condition. We then minimize the functional using a quasi-Newton gradient descent method.

As an application, we study global paths of time-periodic solutions connecting stationary and traveling waves of the Benjamin-Ono equation, which is a model water wave equation closely related KdV. We also study families of time-periodic standing waves for the vortex sheet with surface tension between two incompressible, irrotational, inviscid fluids.

This is joint work with David Ambrose.

Monday, October 26th, 1:00PM. Korman Center, Room 245. Drexel University. Philadelphia, PA 19104.

www.math.drexel.edu/~jdoug/seminar