MS22: Nonlinear Differential Equations

Ill-Posedness of Some Water Wave Models

Jerry L. Bona, *University of Illinois at Chicago*

We discuss recent work revealing that certain naturally derived surface water wave models are not well posed in smooth function classes.

Initial-Boundary Value Problem for the BBM-Equation

Hongqiu Chen, *University of Memphis*

The so-called wave-maker problem for the BBM-equation is studied on the half-line. Improving on earlier results, global well-posedness is established for square-integrable initial data and boundary data that is only assumed to be locally bounded. Moreover, the method shows how the singular point propagates.

Local Discontnuous Galerkin Methods for the Korteweg-de Vries Equation

Ohannes Karakashian, *University of Tennessee*

The Local Discontinuous Galerkin (LDG) method for time dependent problems consists in treating numerically each spatial derivative as a separate variable by writing the equation in system form. We construct and analyze LDG discretizations for the Korteweg-de Vries equation. One difficulty faced by LDG methods is the need to generate approximations to the initial data, now a sequence of derivatives at t=0, which are optimal approximations and but must also satisfy certain compatibility conditions. We provide a general approach for the construction of optimal and compatible initial approximations.

Global Asymptotic Stability in a Model of Biological Networks

Hassan Fathallah-Shaykh, *University of Alabama at Birmingham*

Global asymptotic stability is of importance from a theoretical as well as an application point of view in several elds. We study a system of cubic polynomials that models biological networks. We show that the property that the interconnection matrix is Lyapunov diagonally stable is a key feature that determines convergence to a single equilibrium. We will give examples.