of standard iterative schemes to solve the resulting systems of algebraic equations. In this paper, we extend these high accuracy approximations to the solution of Navier–Stokes equations. Solutions are obtained for the model problem of driven cavity and are compared with solutions obtained using other approximations and those obtained by other authors. It is discovered that the high-order approximations do indeed produce high-accuracy solutions and have a potential for use in solving important problems of viscous fluid flows.

CONSERVATIVE SCHEME FOR A MODEL OF NONLINEAR DISPERSIVE WAVES AND ITS SOLITARY WAVES INDUCED BY BOUNDARY MOTION. Qianshun Chang, Goubin Wang, and Boling Guo, *Academia Sinica, Bejing, PEOPLE'S REPUBLIC OF CHINA.*

A conservative difference scheme is given for a model of nonlinear dispersive waves. Convergence and stability of the scheme are proved. By means of this scheme, we explore numerically the relationship between the boundary data and the amplitudes and the number of solitary waves it produces.

NONLINEAR FOURIER ANALYSIS FOR THE INFINITE-INTERVAL KORTEWEG–DE VRIES EQUATION I: AN ALGORITHM FOR THE DIRECT SCATTERING TRANSFORM. A. R. Osborne, *Universita and Istituto di Cosmo-Geofisica, Torino, ITALY.*

The nonlinear Fourier analysis of wave motion governed approximately by the Korteweg–de Vries (KdV) equation on the infinite line is the central point of discussion. We assume that the wave amplitude is recorded in the form of a discrete space or time series which is determined either by experimental measurement or by computer simulation of the physical system of interest. We develop numerical data analysis procedures based upon the scattering transform solution to the KdV equation as given by Gardner *et al.* We are motivated by the observation that historically the Fourier transform has been ubiquitously used to spectrally analyze linear wave data; here we develop methods for employing the scattering transform as a tool to similarly analyze nonlinear wave data. Specifically we develop numerical methods to evaluate the direct scattering transform (DST) of a space or time series: the approach thus provides a basis for analyzing and interpreting nonlinear wave behavior in the wavenumber or frequency domain. The DST spectrum separates naturally into soliton and radiation components and may be simply interpreted in terms of the large-time asymptotic state of the infinite-line KdV equation.

NONLINEAR FOURIER ANALYSIS FOR THE INFINITE-INTERVAL KORTEWEG–DE VRIES EQUATION II: NUMERICAL TESTS OF THE DIRECT SCATTERING TRANSFORM. A. Provenzale and A. R. Osborne, *Universita and Istituto di Cosmo-Geofisica, Torino, ITALY.*

A recursive algorithm for computing the direct scattering transform (DST) of a discrete space or time series whose dynamics is described approximately by the infinite-line Korteweg–de Vries (KdV) equation is tested for numerical accuracy by considering several example problems for which the exact DST spectrum is known. The effects of truncation, roundoff, discretization, and noise errors are specifically addressed. Procedures for estimating errors in a general experimental context are developed and the nonlinear filtering of noise is discussed.

SPECTRAL METHOD SOLUTION OF THE STOKES EQUATIONS ON NONSTAGGERED GRIDS. Mark R. Schumack, William W. Schultz, and John P. Boyd, *University of Michigan, Ann Arbor, Michigan, USA.*

The Stokes equations are solved using spectral methods with staggered and nonstaggered grids. Numerous ways to avoid the problem of spurious pressure modes are presented, including new techniques using the pseudospectral method and a method solving the weak form of the governing equations