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Editorial

Well-Posed and Ill-Posed Boundary Value Problems for PDE 2013

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The studies of well-posed and ill-posed boundary value problems for partial differential equations are driven not only by a theoretical interest but also by the fact of several phenomena in engineering and various fields of physics and applied sciences. The present special issue is devoted to the publication of high-quality research papers in the fields of the study of analytic and numerical methods for solutions of well-posed and ill-posed boundary value problems for partial differential equations.

The issue covers a wide variety of problems for different classes of partial differential equations. The topics discussed in the contributed papers are traditional for qualitative theory of differential equations. The issue contains papers on the existence, uniqueness, and asymptotic behavior of a classical solution to the initial and Neumann boundary value problem for a class of nonlinear parabolic equations of Monge-Ampere type and on the blow-up phenomena for a modified two-component Dullin-Gottwald-Holm shallow water system. Some new blow-up criteria of strong solutions involving the density and suitable integral form of the momentum are established. Furthermore, an analytical solution for effect of magnetic field and initial stress on an infinite generalized thermoelastic rotating nonhomogeneous diffusion in a medium subjected to certain boundary conditions is studied. The chemical potential is also assumed to be a known function of time at the boundary of the cavity. The analytical expressions for the displacements, stresses, temperature, concentration, and chemical potential are obtained. Comparison was made with the results obtained in the presence and absence of diffusion. The results indicate that the effects of nonhomogeneity, rotation, magnetic field, relaxation time and diffusion are very pronounced.

A number of papers are concerned with well-posedness of difference schemes for approximate solutions of partial differential equations. Interesting stability and coercive stability estimates are established for solutions of the first and second order of accuracy difference schemes for the inverse problem of the multidimensional elliptic equation with overdetermination. The algorithm for approximate solution is tested in a two-dimensional inverse elliptic problem. Moreover, stability estimates are established for the solution of the first order of accuracy difference scheme for the approximate solution of the determination of a control parameter problem for Schrodinger equations. One paper collected in this special issue addresses construction and investigation of a third order of accuracy absolutely stable difference schemes for the nonlocal boundary value hyperbolic problem. The stability estimates for the solution of this difference scheme are