EDITORIAL

1. A tribute and a welcome. The *Journal of Integral Equations and Applications* is a continuation of the "Journal of Integral Equations", (JIE) and will be devoted to the theory, applications and numerical analysis of integral equations of all types. We are very pleased that the Rocky Mountain Mathematics Consortium has agreed to publish this journal.

The Journal of Integral Equations was established in 1979 by A.T. Bharucha-Reid and M.A. Nashed, and published by North-Holland Elsevier Science Publishing Company. Professor Bharucha-Reid died on Febrary 26, 1985 at the age of 57. With the sad circumstances of his sudden death, JIE ceased publication at the end of 1985. At the time of his death, Bharucha-Reid was a Distinguished Professor of Mathematical Sciences and Physics at Atlanta University and Director of the Center for Computational Sciences. He has served as Dean of Graduate Studies at Wayne State University from 1976 to 1982, and held many positions, both in research and teaching (see the obituary in the *Notices* of the American Mathematical Society, Vol 32, No. 3, 1985, pp. 425-526). The interest, encouragement, and editorial guidance of Albert Turner Bharucha-Reid will be sadly missed. On a personal side, we miss his friendship and warmth.

We hope that with the revitalization and broadening of the scope of our journal, we will be able to serve the mathematical, engineering, and physical sciences communities and other users of integral equations. The success of a journal requires the support of readers, authors, referees, and subscribers. We invite your participation and seek your support. We welcome your comments and suggestions. Please send editorial inquiries and comments to the Editors. Orders and other inquiries should be directed to the Rocky Mountain Mathematics Consortium, Arizona State University, Tempe, AZ 85287-1904.

Some of the papers that will appear in the first volume of the *Journal of Integral Equations and Applications* have been accepted for publication in JIE. To the authors of these papers we regret the inconvenience caused by factors beyond the control of the editors of JIE.

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2. Aims and scope. The primary aim of this international journal is to publish high-quality research papers in the area of integral equations and their applications, and it will be particularly devoted to:

The deterministic and probabilistic theory of linear and nonlinear integral equations of various types, integrodifferential equations and related operator equations.

Numerical analysis and approximation methods for integral equations.

Applications of integral equations in the sciences, engineering, and technology.

The journal will also publish occasional survey and expository articles presenting, in some depth, recent advances with respect to particular topics. It will serve as a forum for an exchange of ideas that will stimulate significant contributions in new fields and promote the most salient aspects of the theory of integral equations.

The scope and methodologies will embrace classical and complex analysis methods, functional analysis techniques and topological/geometric methods for the development of the theory of integral equations.

The main topics of the journal

A. *Theory and methods of solutions.* Fredholm integral equations of the first and second kinds; Volterra equations; singular integral equations (including Wiener-Hopf equations, Abel's equations, Cauchy type kernels, Carleman kernels and various singular kernels); integral equations of convolution type; singular nonlinear integral equations; Hammerstein and other nonlinear equations; systems of linear and nonlinear integral equations; integrodifferential equations (both ordinary and partial); integral transforms; Radon transform; operational calculus relevant to integral equations; theory of singular integrals; eigenvalue problems for integral operators; bifurcation problems and nonlinear eigenvalue problems associated with integral equations; integral equations of mixed type; qualitative theory (asymptotic behavior, stability, a priori bounds) of integral equations; kernel functions relevant to integral operators and related boundary-value problems; dual integral equations; asymptotic methods, special functions and orthogonal polynomials in integral equations methods.

B. *Stochastic integral equations, and probabilistic and statistical meth-*

ods for integral equations. Random integral equations of various types; stochastic integrals and related operator equations; probabilistic and statistical methods for deterministic integral equations; aspects of integral equations arising in probabilistic analysis, prediction theory, random walk, Markov processes, probabilistic potential theory, diffusion processes, population genetics, renewal processes, statistical methods.

C. *Operator-theoretic and topological methods for integral equations.* Functional analysis and operator-theoristic methods for the analysis and approximations of (deterministic and stochastic) integral equations; operator equations related to and motivated by consideration of integral equations; abstract theory of integral equations; integral equations in abstract spaces; fixed point theorems and variational methods; properties of resolvents; geometrical and topological methods for analysis and qualitative theory of integral equations; integral operators on various spaces; theory of singular integrals; ill-posed problems associated with integral equations; spectral theory of integral operators; abstract singular equations; singular integral operators on manifolds; function algebras of integral operators; factorization; psuedodifferential operators; intergrodifferential evolution equations; semigroup methods; group-theoretic methods; algebraic methods.

D. *Numerical analysis and approximation theory for integral equations.* Emphasis will be placed on the structure and properties of integral eqautions which play a salient role in numerical and approximation method, and related matrices and operators.

E. *Applications of integral equations.* Considerable weight will be given to applications of integral equations with expositions that make the material accessible to the non-specialist. New integral equation formulations of boundary-value problems of mathematical physics, and new models involving integral equations are particularly welcome. Applications to all areas of the sciences, engineering and technology are solicited including quantum field theory, control and optimization theory, radiative transfer and transport theory, biology, chemical processes, integral representations of boundary value problems, potential theory, elastostatics, elasticity, electromagnetic fields and scattering theory, hydrodynamics, astrophysics, geophysics, stochastic systems, seismology, pattern recognition, ill-posed and inverse problems, identification problems, signal processing, tomography, hereditary systems, population dynamics, genetics, epidemiology, viscoelasticity, and viscoelastic

flow.

The Journal of *Integral Equations and Applications* welcomes papers on any of the above topics which emphasize salient features of integral equations.

Manuscripts of purely abstract character (for example, papers on evolution and operator equations, fixed point, etc.) will be considered for publication only if their bearing on integral equations is apparent. New integral equation formulation of models in various fields are particularly welcome; on the other hand routine applications to specific problems are not suitable. Papers on numerical and approximation methods as well as statistical and probabilistic methods are acceptable if they specifically contribute to integral equations in an essential way.

4. Editorial delineation of journal coverage. Integral equations can be broadly classified into seven categories:

(1) Volterra equations

(2) Fredholm equations of the second kind

(3) Fredholm equations of the first kind

(4) Singular integral equations

(5) Integrodifferential equations (involving ordinary, partial, and functional equations) of Volterra, Fredholm or mixed type.

(6) Integral transforms, the Radon transform, and related convolution equations.

(7) Stochastic integral equations; random equations.

For editorial purposes the scope of the journal and the editorial responsibilities will be divided according to these seven categories. Each of these categories encompasses linear and nonlinear equations, theory, numerical methods, and applications. While there is some overlap in the categories, the techniques are markedly different. Specific responsibilities for each of these areas will be distributed among the members of the Editorial Board.

The scope of the journal may also be divided in accordance with methods and techniques used:

(1) Theory of integral equations using classical and complex analysis methods.

(2) Theory of integral equations using functional analysis methods; geometric/topological methods; qualitative methods; abstract theory of integral equations.

(3) Stochastic and statistical methods in integral equations.

(4) Numerical analysis and approximation methods for integral equations.

Applications of integral equations will be divided for editorial purposes into three categories:

(1) Physical and engineering sciences.

(2) Biological sciences.

(3) Other applications.

The goal of the editorial policy is to make the journal all inclusive of major undertakings in the above categories and approaches.

5. Sections of the journal.

1. *Research papers.* This is the principal section and the core of the journal.

The following sections will also be featured whenever worthy contributions become available.

2. *Survey and expository papers.*

3. *Models and Problems.* This section will feature models that lead to new integral equations. It will also serve as a forum for experimentalists who have data from models involving integral equations and theoreticians and numerical analysts in the integral equations to exchange ideas, to criticize or refine existing models, and promote new ones. This section will also include clear statements of open problems in the theory and practice of integral equations.

4. *Software.* This section will be devoted to the open exchange of information on carefully tested software programs for various aspects of integral equations. Information about availability and development of software, practical implementation of methods for integral equations and their complexity will also be published.

5. *Book reviews.*

i) Short review of new books in this fields.

ii) Comprehensive comparative review of several related books and of the area they span.

6. *Short communications.* This section is devoted to short communications of results for special integral equations, obtainable by standard methods, but which are of interesting content and/or applications. Proofs are usually omitted, or sketched very briefly; however, for refereeing purposes, details should be provided separately by the authors.

Information for authors and institutional subscriptions are contained in the back cover of this issue.

P.M. Anselone
M.A. Nashed
Editors