# Contents

*Contributors* *ix*
*Preface* *xiii*

## Lectures

Volterra Series and the Alternative Method of Cesari 1
*Thomas T. Bowman*

Periodic Solutions of Nonlinear Vibrating Strings 11
*Haïm Brezis*

Nonlinear Boundary Value Problems for Hyperbolic Systems 31
*Lamberto Cesari*

Non-Linear Ion Dynamics, and the Application to Neurophysiology 59
*H. S. Green and T. Triffet*

Qualitative and Quantitative Particle Modeling with Applications to Wave Generation, Vibration, and Biomathematics 71
*Donald Greenspan*

Asymptotic Behavior of Gradient-Like Systems 85
*Jack K. Hale and Paul Massatt*

On Bifurcation and Stability of Positive Solutions of Nonlinear Elliptic Eigenvalue Problems 103
*Peter Hess*

A Note on the Stability in Retarded Delay Equations for all Delays 121
*Ettore F. Infante*

System Identification from Noisy Data 135
*R. E. Kalman*

Random Forcing in Nonlinear Oscillations 165
*R. Kannan*

Wave-Solutions of Reversible Systems and Applications 181
*Klaus Kirchgässner*

Stable Subcritical Buckled States of a Cylindrical Panel 201
*George H. Knightly and D. Sather*

Well-Posedness and Stabilizability Problems for Boundary Feedback Partial Differential Equations 217
*I. Lasiecka and R. Triggiani*

Some Remarks on Periodic Solutions of Parabolic Differential Equations 227
*Alan C. Lazer*

On Limitations to the Solution Set of Some Nonlinear Problems 247
*Alan C. Lazer and P. J. McKenna*

Nonresonance Conditions of Nonuniform Type in Nonlinear Boundary Value Problems 255
*Jean Mawhin*

Asymptotic Analysis of Some Functional Differential Equations 277
*Roger D. Nussbaum*

Triggered Systems and the Extension Problem for Gradient Systems 303
*V. M. Popov*

Optimal Approximate Filter for a Diffusion Type Process 319
*Z. R. Pop-Stojanovic and Murali Rao*

Some Homotopy Theorems Concerning Leray–Schauder Maps 327
*E. H. Rothe*

Prolongation Algebras and Gauge Theories for Isospectral Problems 349
*D. H. Sattinger*

Two Stefan Problems for a Degenerate Parabolic System 367
*R. E. Showalter*

Perturbations of Degenerate Singularities 375
*Carl P. Simon and Charles J. Titus*

Gas–Solid Reactions 403
*Ivar Stakgold*

Transformations, Iterations, and Mixing Flows 419
*Stanislaw Ulam*

Families of Periodic Solutions for Autonomous Systems 427
*A. L. Vanderbauwhede*

Forgotten Parameters and Catastrophic Behavior in a Stochastic Buckling Problem 447
*H. F. Weinberger and S. Rosenblat*

## Contributed Papers

Periodic Orbits and Topological Entropy of One-Dimensional Discrete Dynamical Systems 499
*Louis Block*

Numerical Methods for Nonlinear Boundary Value Problems at Resonance 505
*Charles Burnap and P. J. McKenna*

Application of the Adjoint Theory for NFDEs to the Well-Posedness Problem for Certain Distributed Systems 513
*John A. Burns, Terry L. Herdman, and Harlan W. Stech*

Existence of Solutions for a System of Equations of Nonlinear Elastic Materials 515
*Oyuke Benjamin Calleb*

Patterson Measure and Anosov Flow 521
*S. Chen*

Asymptotic Properties of Solutions of Generalized Emden–Fowler Equations 529
*John R. Graef, Myron K. Grammatikopoulos, and Paul W. Spikes*

An Initial Value, Finite Element Method 535
*John Gregory, Marvin Zeman, and Charles Gibson*

On Causality, Inverses, and Feedback 539
*Jacob Hammer*

The Generator of a $C^r$ Flow 547
*David Hart*

The Induced Subflow Pertaining to the Internal Model Principle 555
*J. S. A. Hepburn and W. M. Wonham*

On the Problem of Embedding Discrete Flows in Continuous Flows 565
*Gary D. Jones*

Solutions of Lyapunov- and Riccati-Type Matrix Equations Arising in Optimal Control Theory and Systems Theory 569
*John Jones, Jr.*

Some Features of the MacArthur–Wilson Island Population Model 575
*James Keesling*

Continuous Flows Satisfying Stability and Recurrence Criteria 581
*Ronald A. Knight*

Modulation Instability and Weak Turbulence 589
*W. F. Langford*

Semidiscrete Approximation of a Time-Optimal Control Problem for Parabolic Equations 595
*Irena Lasiecka*

Exponential Dichotomy for a Second Order Linear Hyperbolic System with One State Variable 601
*Orlando Lopes and Hermano Ribeiro*

On the Regulator Problem and the Operatorial Riccati Equation in Hilbert Spaces 605
*J.-Cl. Louis and D. Wexler*

Bang-Bang Control and Local Semi-Dynamical Systems on CW Complexes 613
*David Meeker*

Characterizing the Range of a Nonlinear Operator 621
*Kent Nagle and Kenneth Pothoven*

Approximation of Generalized Solutions of an Abstract Functional Differential Equation 627
*Mary E. Parrott*

On the Morse Index for Infinite Dimensional Semiflows 633
*Krzysztof P. Rybakowski*

An Existence Theorem for Abstract Nonlinear Hyperbolic Boundary Value Problems at Resonance 639
*Michael W. Smiley*

A Characterization of Asymptotic Controllability 645
*Eduardo D. Sontag*

Maximality and Upper Semicontinuity 649
*M. B. Suryanarayana*

Generalized-Function and Analytic Solutions of Functional Differential Equations 655
*Joseph Wiener*

*Participants* 663