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Nota di contenuto	An Overview of Durability and Damage Tolerance Methodology at NASA Langley Research Center, Jonathan Ransom, Edward Glaessgen, James Ratcliffe -- On the -convergence Theory and its Application to Block Copolymer Morphology, Xiaofeng Ren -- ‘Rainbows’ in homogeneous and radially inhomogeneous spheres: connections with ray, wave and potential scattering theory, John Adam -- Understanding the Dynamics of Collision and near-collision motion in the N-body problem, Lennard Bakker -- Absolute Stability and Conditional Stability in General Delayed Differential Equations, Junping Shi -- Existence of Antiperiodic solutions to semilinear evolution equations in intermediate Banach Spaces, Gaston N’Guerekata, Gisele Mophou -- Signal, Image Processing and Machine Learning; The Key to Complex Problems in

Medicine and Biology, Masha Zahery, Kayvan Najarian -- Real-Time Noise Cancellation using Wavelet Transforms, Eshan Sheybani -- Null Controllability of the heat equation with two constraints on the control: application to a discriminating sentinel with given sensitivity, Ousseynou Nakoulima, Sadou Tao -- A Galerkin Method Solution of Heat Transfer Problems in Closed Channels: Fluid Flow Analysis, Nasser Ghariban -- Optimal Control for Distributed Linear Systems subjected to Null-controllability with constraints on the state, Michelle Mercan -- Almost and Pseudo-almost Limit Cycles with Applications to quasiperiodic Solitary Waves, Bourama Toni, Melissa Watts -- On Almost periodic Stochastic Difference Equations, Paul Bezandry.

Sommario/riassunto

This volume contains the invited contributions to the Spring 2012 seminar series at Virginia State University on Mathematical Sciences and Applications. It is a thematic continuation of work presented in Volume 24 of the Springer Proceedings in Mathematics & Statistics series. Contributors present their own work as leading researchers to advance their specific fields and induce a genuine interdisciplinary interaction. Thus all articles therein are selective, self-contained, and are pedagogically exposed to foster student interest in science, technology, engineering and mathematics, stimulate graduate and undergraduate research, as well as collaboration between researchers from different areas. The volume features new advances in mathematical research and its applications: anti-periodicity; almost stochastic difference equations; absolute and conditional stability in delayed equations; gamma-convergence and applications to block copolymer morphology; the dynamics of collision and near-collision in celestial mechanics; almost and pseudo-almost limit cycles; rainbows in spheres and connections to ray, wave and potential scattering theory; null-controllability of the heat equation with constraints; optimal control for systems subjected to null-controllability; the Galerkin method for heat transfer in closed channels; wavelet transforms for real-time noise cancellation; signal, image processing and machine learning in medicine and biology; methodology for research on durability, reliability, damage tolerance of aerospace materials and structures at NASA Langley Research Center. The volume is suitable and valuable for mathematicians, scientists and research students in a variety of interdisciplinary fields, namely physical and life sciences, engineering and technology including structures and materials sciences, computer science for signal, image processing and machine learning in medicine.