

Preface

A couple of years ago Alberto Pinto informed me that he was planning to organize an international conference on dynamical systems and game theory in honor of Mauricio Peixoto and David Rand. I told him that I wholeheartedly support the idea and will ask the International Society of Difference Equations (ISDE) to support the proposed conference which it did later. Through my frequent visits to Portugal, I became aware of the significant contributions in dynamical systems and game theory made by Portuguese mathematicians and have subsequently been involved in fruitful discussions or joint research with a number of them. The growth of dynamical systems and game theory research in Portugal has placed Portuguese mathematicians at the forefront of these emerging fields, bringing worldwide recognition to their contributions. Indeed, in addition to DYNA2008, Portuguese researchers organized two of the last three International conferences on difference equations and applications (ICDEA), which included important talks on dynamical systems and game theory.

The work in this area has unveiled beautiful and deep mathematical theories that capture universal characteristics observed in many apparently unrelated natural phenomena and complex social behavior. Mauricio Peixoto has made lasting contributions in classifying and understanding a variety of behaviors of dynamical systems. Today these problems are the main research focus in diverse yet complementary areas at distinguished research institutions like IMPA, the institute founded by Mauricio Peixoto and Leopoldo Nachbin, and University of Warwick. Alberto Pinto has made notable contributions through his studies on rigidity properties of infinitely renormalizable dynamical systems. In addition, he discovered stochastic universalities in complex natural and social phenomena, e.g. rivers, sunspots and stock market indices, and is developing a theory with Peixoto in semi-classics physics using Peixoto's focal decomposition. David Rand, a world-leading authority, has contributed deeply and broadly to this area by developing theoretical aspects of these two fields, and identifying properties of infinitely renormalizable, universal and chaotic phenomena throughout the sciences – especially in biology, economics and physics. In collaboration with Alberto Pinto, he constructed a fine classification of dynamical systems. Moreover, the research groups led by David Rand and Alberto Pinto have, independently, developed new schools of inquiry using

game theoretical and dynamic models applied to biology, economics, finances, psychology and sociology.

The research and survey papers in these volumes, written by leading researchers in their scientific areas, focus on these and many other relevant aspects of dynamical systems, game theory and their applications to science and engineering. The papers in these volumes are based on talks given at the International Conference DYNA2008, in honor of Mauricio Peixoto and David Rand. This conference, held at the University of Minho, was organized by Alberto Pinto and his colleagues and brought together influential researchers from around the world. It is worthwhile to note the warmth and hospitality of the organizers who made sure we enjoyed the beautiful region of Minho with its rich culture and fine cuisine.

Saber Elaydi

Dynamics, Games and Science I

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