

Econophysics And Sociophysics

Econophysics and Sociophysics Evolutionary Games with Sociophysics Econophysics and Sociophysics Econophysics and Sociophysics: Recent Progress and Future Directions Foundations and Applications of Complexity Economics Economic Foundations for Social Complexity Science Econophysics of Markets and Business Networks New Perspectives and Challenges in Econophysics and Sociophysics Physics of society: econophysics and sociophysics Econophysics Sociophysics XXXI International Workshop on Condensed Matter Theories (CMT31) Students' Development of Models of Magnetic Materials, Patterns of Group Activity, and Social Norms in a Physics Classroom Journal of Economic Literature Science & Culture Complex Systems 32nd International Workshop on Condensed Matter Theories Physics of Random Networks, Econophysics and Models of Biophysics and Sociophysics Journal of the Physical Society of Japan Acta Physica Polonica Bikas K. Chakrabarti Jun Tanimoto Bikas K. Chakrabarti Frédéric Abergel J. Barkley Rosser, Jr. Yuji Aruka Arnab Chatterjee Frédéric Abergel Gheorghe Savoiu Serge Galam Andrew P. Johnson Horacio S. Wio

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Rosser, Jr. Yuji Aruka Arnab Chatterjee Frédéric Abergel Gheorghe Savoiu Serge Galam Andrew P. Johnson Horacio S. Wio

using tricks to handle coupled nonlinear dynamical many body systems several advancements have already been made in understanding the behavior of markets economic social systems and their dynamics the book intends to provide the reader with updated reviews on such major developments in both econophysics and sociophysics by leading experts in the respective fields this is the first book providing a panoramic view of these developments in the last decade

recent applications of evolutionary game theory in the merging fields of the mathematical and social sciences are brilliantly portrayed in this book which highlights social physics and shows how the approach can help to quantitatively model complex human environmental social systems first readers are introduced to the fundamentals of evolutionary game theory the two player two strategy game or the 2 2 game is presented as an archetype to help understand the difficulty of cooperating for survival against defection in common social contexts subsequently the book explains the theoretical background of the multi player two strategy game which may be more widely applicable than the 2 2 game for social dilemmas the latest applications of 2 2 games are also discussed to explore how integrated reciprocity mechanisms can solve social dilemmas in turn the book describes two practical areas in which evolutionary game theory has been applied the first concerns traffic flow analysis in conventional interpretations traffic flow can be understood by means of fluid dynamics in which the flow of vehicles is evaluated as a continuum body such a simple idea however does not work well in reality particularly if a driver s decision making process is considered various dilemmas involve complex structures that depend primarily on traffic density a revelation that should help establish a practical solution for reducing traffic congestion second the book provides keen insights into how powerful evolutionary game theory can be in the context of epidemiology both approaches quasi analytical and multi agent simulation can clarify how an infectious disease such as seasonal influenza spreads across a complex social network which is significantly affected by the public attitude toward vaccination a methodology is proposed for the optimum design of a public vaccination policy incorporating subsidies to efficiently increase vaccination coverage while minimizing the social cost

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this book presents the proceedings from econophys 2015 an international workshop held in new delhi india on the interrelated fields of econophysics and sociophysics which have emerged from the application of statistical physics to economics and sociology leading researchers from varied communities including economists sociologists financial analysts mathematicians physicists statisticians and others report on their recent work discuss topical issues and review the relevant contemporary literature a society can be described as a group of people who inhabit the same geographical or social territory and are mutually involved through their shared participation in different aspects of life it is possible to observe and characterize average behaviors of members of a society an example being voting behavior moreover the dynamic nature of interaction within any economic sector comprising numerous cooperatively interacting agents has many features in common with the interacting systems of statistical physics it is on these bases that interest has grown in the application within sociology and economics of the tools of statistical mechanics this book will be of value for all with an interest in this flourishing field

this book presents a survey of the aspects of economic complexity with a focus on foundational interdisciplinary ideas the long awaited follow up to his 2011 volume complex evolutionary dynamics in urban regional and ecologic economic systems from catastrophe to chaos and beyond this volume draws together the threads of rosser s earlier work on complexity theory and its wide applications in economics and an expanded list of related disciplines the book begins with a full account of the broader categories of complexity in economics dynamic computational hierarchical and structural before shifting to more detailed analysis the next two chapters address problems associated with computational complexity especially those of computability and discuss the godel incompleteness theorem with a focus on reflexivity the middle chapters discuss the relationship between entropy econophysics evolution and economic complexity respectively with applications in urban and regional dynamics ecological economics general equilibrium theory as well as

financial market dynamics the final chapter works to bring together these themes into a broader framework and expose some of the limits concerning analysis of deeper foundational issues with applications in all disciplines characterized by interconnected nonlinear adaptive systems this book is appropriate for graduate students professors and practitioners in economics and related disciplines such as regional science mathematics physics biology environmental sciences philosophy and psychology

this book focuses on how important massive information is and how sensitive outcomes are to information in this century humans now are coming up against the massive utilization of information in various contexts the advent of super intelligence is drastically accelerating the evolution of the socio economic system our traditional analytic approach must therefore be radically reformed in order to adapt to an information sensitive framework which means giving up myopic purification and the elimination of all considerations of massive information in this book authors who have shared and exchanged their ideas over the last 20 years offer thorough examinations of the theoretical ontological basis of complex economic interaction econophysics and agent based modeling during the last several decades this book thus provides the indispensable philosophical scientific foundations for this new approach and then moves on to empirical epistemological studies concerning changes in sentiments and other movements in financial markets

econophysics research studies which apply methods developed by physicists to solve problems in economics enable you to deepen your understanding of what financial systems are and how they operate articles in this book identify and explain the statistical behavior of the underlying networks in trading banking and stock markets as well as other financial systems authors also debate the latest issues arising from these econophysics studies

this book presents the latest perspectives and challenges within the interrelated fields of econophysics and sociophysics which have emerged from the application of statistical physics to economics and sociology economic and financial markets appear to be in a permanent state of flux billions of agents interact with each other giving rise to complex dynamics of economic quantities at the micro and macro levels with the availability of huge data sets researchers can address questions at a much more granular level than was previously possible fundamental questions regarding the aggregation of actions and information and the coordination complexity and

evolution of economic and financial networks are currently receiving much attention in the econophysics research agenda in parallel the sociophysics literature has focused on large scale social data and their interrelations in this book leading researchers from different communities economists sociologists financial analysts mathematicians physicists statisticians and others report on their recent work and their analyses of economic and social behavior

the remarkable evolution of econophysics research has brought the deep synthesis of ideas derived from economics and physics to subjects as diverse as education banking finance and the administration of large institutions the original papers in this collection present a broad summary of these advances written by interdisciplinary specialists included are studies on subjects in the development of econophysics on the perspectives offered by econophysics on large problems in economics and finance including the 2008 9 financial crisis and on higher education and group decision making the introductions and insights they provide will benefit everyone interested in applications of this new transdisciplinary science ten papers present an updated version of the origins issues and applications of econophysics economics and finance chapters consider lessons learned from the 2008 9 financial crisis sociophysics chapters propose new thinking on educational reforms and group decision making

do humans behave much like atoms sociophysics which uses tools and concepts from the physics of disordered matter to describe some aspects of social and political behavior answers in the affirmative but advocating the use of models from the physical sciences to understand human behavior could be perceived as tantamount to dismissing the existence of human free will and also enabling those seeking manipulative skills this thought provoking book argues it is just the contrary indeed future developments and evaluation will either show sociophysics to be inadequate thus supporting the hypothesis that people can primarily be considered to be free agents or valid thus opening the path to a radically different vision of society and personal responsibility this book attempts to explain why and how humans behave much like atoms at least in some aspects of their collective lives and then proposes how this knowledge can serve as a unique key to a dramatic leap forwards in achieving more social freedom in the real world at heart sociophysics and this book are about better comprehending the richness and potential of our social interaction and so distancing ourselves from inanimate atoms

this dissertation is a study of students model development processes in a physical science course for preservice elementary teachers it details the models of magnetic materials developed and used by students during a unit on static electricity and magnetism in this inquiry based course the class developed and formally accepted a model in the form of diagrams and descriptions that is very similar to the accepted magnetic domains model they did this without textbooks or lectures on magnetism before adopting this model however most groups in the class temporarily used models involving opposite charges at the two ends of magnetized nails how did the students do it the explanation involves detailed study of the groups interactions and use of structure in the classroom environment this dissertation uses two theoretical frameworks to analyze interactions it applies yackel and cobb s 1996 concepts of classroom social norms to characterize aspects of the classroom participation structure which affected groups construction and declaration of models it also applies distributed cognition ideas to analyze the sense making conversations that small groups had when constructing group responses this research found that conversations in one small group could be characterized into sixteen categories important categories included extending ideas which involved gradual deepening and elaboration of the group s understanding of their model s and joint typing an interactive process by which group members collaborated on typed statements or group diagrams and simultaneously developed common language for communicating their ideas to each other some of these categories of activity were closely connected to computer use also four classroom norms are described one small group social classroom norm involved group members developing a common ground consisting of agreed upon group statements three sociophysics norms which characterize the whole class interactions as well as those of the small group involved a distinction between generalizations of phenomena and theoretical statements class criteria for accepting evidence and the obligation for each group to have a model of magnetic materials that they could support with acceptable evidence

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