ECONOMIC SIMULATIONS IN SWARM:

Agent-Based Modelling and Object Oriented Programming

Edited by

Francesco Luna

Economic Simulations In Swarm Agent Based Modelling And Object Oriented Programming

RC Schank

Economic Simulations In Swarm Agent Based Modelling And Object Oriented Programming:

Economic Simulations in Swarm: Agent-Based Modelling and Object Oriented Programming Francesco Luna,Benedikt Stefansson,2012-12-06 Computer simulations of economic systems are slowly gaining ground within the economic profession However such a process is hindered by a lack of communication among researchers who do not share a common language For its object oriented structure and its versatility Swarm has the necessary characteristics to become a credible universal language of agent based simulations Economic Simulations in Swarm collects a series of original articles in such domains as macro and micro economics industrial organization monetary theory and finance all linked by a common denominator the use of the Swarm simulation platform Swarm a standard set of program libraries allows users to construct simulations where a collection of heterogeneous independent agents or elements interact through discrete events This volume offers the first extensive tutorial to the use of these software libraries developed at the Santa Fe Institute as part of the ongoing research into complexity The editors conceived the idea of this book while visiting the Santa Fe Institute as members of the Working Group on Adaptive and Computable Economics Francesco Luna is a specialist in Computable Economics and Benedikt Stefansson is an active contributor to the Swarm community **New Tools of Economic Dynamics** Jacek Leskow,Martin Puchet,Lionello F. Punzo,2006-05-06 New Tools of Economic Dynamics gives an introduction and overview of recently developed methods and tools most of them developed outside economics to deal with the qualitative analysis of economic dynamics It reports the results of a three year research project by a European and Latin American network on the intersection of economics with mathematical statistical and computational methods and techniques Focusing upon the evolution and manifold structure of complex dynamic phenomena the book reviews and shows applications of a variety of tools such as symbolic and coded dynamics interacting agents models microsimulation in econometrics large scale system analysis and dynamical systems theory It shows the potential of a comprehensive analysis of growth fluctuations and structural change along the lines indicated by pioneers like Harrod Haavelmo Hicks Goodwin Morishima and it highlights the explanatory power of the qualitative approach they initiated *Multi-Agent-Based Simulation XXII* Koen H. Van Dam,Nicolas Verstaevel,2022-01-15 This book constitutes the thoroughly refereed post conference proceedings of the 21st International Workshop on Multi Agent Based Simulation MABS 2021 held in May 2021 as part of AAMAS 2021 The conference was held virtually due to COVID 19 pandemic The 14 revised full papers included in this volume were carefully selected from 23 submissions The workshop focused on finding efficient solutions to model complex social systems in such areas as economics management organizational and social sciences in general In all these areas agent theories metaphors models analysis experimental designs empirical studies and methodological principles all converge into simulation as a way of achieving explanations and predictions exploration and testing of hypotheses better designs and systems and providing decision support in a wide range of applications *Software Engineering Education in the Modern Age* Paola Inverardi,Mehdi

Jazayeri,2006-12-15 This tutorial book presents an augmented selection of the material presented at the Software Engineering Education and Training Track at the International Conference on Software Engineering ICSE 2005 held in St Louis MO USA in May 2005 The 12 tutorial lectures presented cover software engineering education state of the art and practice creativity and rigor challenges for industries and academia as well as future directions **Interdisciplinary Applications of Agent-Based Social Simulation and Modeling** Adamatti, Diana Francisca,Dimuro, Graçaliz Pereira,Coelho, Helder,2014-04-30 Social simulation can be a difficult discipline to encompass fully There are many methods models directions and theories that can be discussed and applied to various social sciences Anthropology sociology political science economy government and management can all benefit from social simulation Interdisciplinary Applications of Agent Based Social Simulation and Modeling aims to bring a different perspective to this interdisciplinary topic This book presents current discussions and new insights on social simulation as a whole focusing on its dangers pitfalls deceits and challenges This book is an essential reference for researchers in this field professionals using social simulation and even students studying this discipline *Agent-based Modeling of Tax Evasion* Sascha Hokamp,Laszlo Gulyas,Matthew Koehler,Sanith Wijesinghe,2018-03-19 The only single source guide to understanding using adapting and designing state of the art agent based modelling of tax evasion A computational method for simulating the behavior of individuals or groups and their effects on an entire system agent based modeling has proven itself to be a powerful new tool for detecting tax fraud While interdisciplinary groups and individuals working in the tax domain have published numerous articles in diverse peer reviewed journals and have presented their findings at international conferences until Agent based Modelling of Tax Evasion there was no authoritative single source guide to state of the art agent based tax evasion modeling techniques and technologies Featuring contributions from distinguished experts in the field from around the globe Agent Based Modelling of Tax Evasion provides in depth coverage of an array of field tested agent based tax evasion models Models are presented in a unified format so as to enable readers to systematically work their way through the various modeling alternatives available to them Three main components of each agent based model are explored in accordance with the Overview Design Concepts and Details ODD protocol each section of which contains several sub elements that help to illustrate the model clearly and that assist readers in replicating the modeling results described Presents models in a unified and structured manner to provide a point of reference for readers interested in agent based modelling of tax evasion Explores the theoretical aspects and diversity of agent based modeling through the example of tax evasion Provides an overview of the characteristics of more than thirty agent based tax evasion frameworks Functions as a solid foundation for lectures and seminars on agent based modelling of tax evasion The only comprehensive treatment of agent based tax evasion models and their applications this book is an indispensable working resource for practitioners and tax evasion modelers both in the agent based computational domain and using other methodologies It is also an excellent pedagogical resource for teaching tax evasion modeling and or

agent based modeling generally *Agent-Based Methods in Economics and Finance* Francesco Luna,Alessandro Perrone,2012-12-06 This second book on financial and economic simulations in Swarm marks the continued progress by a group of researchers to incorporate agent based computer models as an important tool within their disci pline It is encouraging to see such a clear example of Swarm helping to foster a community of users who rely on the Swarm framework for their own analyses Swarm aims at legitimizing agent based computer models as a tool for the study of complex systems A further goal is that a common base framework will lead to the growth of user communities in specific areas of application By providing an organizing framework to guide the development of more problem specific structures and by dealing with a whole range of issues that affect their fundamental correctness and their ability to be developed and reused Swarm has sought to make the use of agent based models a legitimate tool of scientific investigation that also meets the practical needs of investigators within a community **Formal Languages for Computer Simulation: Transdisciplinary Models and Applications** Fonseca i Casas, Pau,2013-07-31 Models and simulations are an important first step in developing computer applications to solve real world problems However in order to be truly effective computer programmers must use formal modeling languages to evaluate these simulations Formal Languages for Computer Simulation Transdisciplinary Models and Applications investigates a variety of programming languages used in validating and verifying models in order to assist in their eventual implementation This book will explore different methods of evaluating and formalizing simulation models enabling computer and industrial engineers mathematicians and students working with computer simulations to thoroughly understand the progression from simulation to product improving the overall effectiveness of modeling systems *Meeting the Challenge of Social Problems via Agent-Based Simulation* T. Terano,H. Deguchi,K. Takadama,2012-12-06 The series of international workshops on Agent Based Approaches in Economic and Social Complex Systems AESCS is part of the worldwide activities on computational social and organizational sciences The second workshop AESCS 02 focusing on progress of agent based simulation was held in Tokyo in August 2002 AESCS 02 explored the frontiers of the field The importance of cumulative progress was emphasized in discussions of common tasks standard computational models replication and validation issues and evaluation and verification criteria Promoting multidisciplinary work in computational economics organizational science social dynamics and complex systems AESCS 02 brought together researchers from diverse fields This book contains the invited papers by Robert Axtell Shu Heng Chen and Takao Terano along with selected papers collected in three major sections Economic Systems Marketing and Management and Social Systems and Methodology

Network Theory and Agent-Based Modeling in Economics and Finance Anindya S. Chakrabarti,Lukáš Pichl,Taisei Kaizoji,2019-10-23 This book presents the latest findings on network theory and agent based modeling of economic and financial phenomena In this context the economy is depicted as a complex system consisting of heterogeneous agents that interact through evolving networks the aggregate behavior of the economy arises out of billions of small scale interactions

that take place via countless economic agents The book focuses on analytical modeling and on the econometric and statistical analysis of the properties emerging from microscopic interactions In particular it highlights the latest empirical and theoretical advances helping readers understand economic and financial networks as well as new work on modeling behavior using rich agent based frameworks Innovatively the book combines observational and theoretical insights in the form of networks and agent based models both of which have proved to be extremely valuable in understanding non linear and evolving complex systems Given its scope the book will capture the interest of graduate students and researchers from various disciplines e g economics computer science physics and applied mathematics whose work involves the domain of complexity theory *Advances in Social Simulation* Bogumił Kamiński,Grzegorz Koloch,2013-07-30 This book is the conference proceedings of ESSA 2013 the 9th Conference of the European Social Simulation Association ESSA conferences constitute annual events which serve as an international platform for the exchange of ideas and discussion of cutting edge research in the field of social simulations both from the theoretical as well as applied perspective This book consists of 33 articles which are divided into four themes Methods for the development of simulation models Applications of agent based modeling Adaptive behavior social interactions and global environmental change and using qualitative data to inform behavioral rules We are convinced that this book will serve interested readers as a useful compendium which presents in a nutshell the most recent advances at the frontiers of social simulation research Mathematical Modeling and Simulation of Systems Volodymyr Kazymyr,Anatoliy Morozov,Alexander Palagin,Serhiy Shkarlet,Nikolai Stoianov,Dmitri Vinnikov,Mark Zheleznyak,2025-04-29 This book contains papers on mathematical modeling and simulation of processes in various areas in ecology and the environment manufacturing and energetics information technology samples of special purpose equipment and cyber physical systems In the context of comprehensive digitalization computer modeling becomes a direct component of creating and operating modern complex multi domain systems The outcomes presented in the book will be useful to specialists involved in the modeling of real world and cyber physical systems physical processes simulation management and decision making models functioning and cybersecurity models modeling software and tools Scientists have the opportunity to familiarize themselves with the latest research in a variety of solutions proposed by leading scientists and to determine promising directions for solving complex scientific and practical tasks Chapters of this book contain papers presented at the 19th MODS International Conference November 11 13 2024 Chernihiv Ukraine The Rational Expectation Hypothesis, Time-Varying Parameters and Adaptive Control Marco P. Tucci,2012-12-06 One of the major controversies in macroeconomics over the last 30 years has been that on the effectiveness of stabilization policies However this debate between those who believe that this kind of policies is useless if not harmful and those who argue in favor of it has been mainly theoretical so far The Rational Expectation Hypothesis Time Varying Parameters and Adaptive Control wants to represent a step toward the construction of a common ground on which to empirically compare the two beliefs and to do this

three strands of literature are brought together The first strand is the research on time varying parameters TVP the second strand is the work on adaptive control and the third one is the literature on linear stationary models with rational expectations RE The material presented in The Rational Expectation Hypothesis Time Varying Parameters and Adaptive Control is divided into two parts Part 1 combines the strand of literature on adaptive control with that on TVP It generalizes the approach pioneered by Tse and Bar Shalom 1973 and Kendrick 1981 and one recently used in Amman and Kendrick 2002 where the law of motion of the TVP and the hyperstructural parameters are assumed known to the case where the hyperstructural parameters are assumed unknown Part 2 is devoted to the linear single equation stationary RE model estimated with the error in variables EV method It presents a new formulation of this problem based on the use of TVP in an EV model This new formulation opens the door to a very promising development All the theory developed in the first part to control a model with TVP can sic et simpliciter be applied to control a model with RE **Behavioral Computational Social Science** Riccardo Boero,2015-09-28 This book is organized in two parts the first part introduces the reader to all the concepts tools and references that are required to start conducting research in behavioral computational social science The methodological reasons for integrating the two approaches are also presented from the individual and separated viewpoints of the two approaches The second part of the book presents all the advanced methodological and technical aspects that are relevant for the proposed integration Several contributions which effectively merge the computational and the behavioral approaches are presented and discussed throughout *Quantitative Economic Policy* Reinhard Neck,Christian Richter,Peter Mooslechner,2008-03-04 Econometric techniques and models are still being extensively used in the business of forecasting and policy advice This book presents recent advances in the theory and applications of quantitative economic policy with particular emphasis on fiscal and monetary policies in a European and global context The volume honors Andrew Hughes Hallett a pioneer and major scientist in quantitative economic policy analysis whose contributors are among his friends and former students Artificial Intelligence: Methodology, Systems, and Applications Christoph Bussler,2004-08-23 This book constitutes the refereed proceedings of the 11th International Conference on Artificial Intelligence Methodology Systems and Applications AIMSA 2004 held in Varna Bulgaria in September 2004 The 52 revised full papers presented were carefully reviewed and selected from 176 submissions The papers are organized in topical sections on ontology engineering semantic Web services knowledge representation and processing machine learning and data mining natural language processing soft computing neural networks e learning systems multiagent systems pattern recognition intelligent decision making and information retrieval **Advances in Practical Applications of Survivable Agents and Multi-Agent Systems: The PAAMS Collection** Yves Demazeau,Eric Matson,Juan Manuel Corchado,Fernando De la Prieta,2019-06-25 This book constitutes the proceedings of the 17th International Conference on Practical Applications of Agents and Multi Agent Systems PAAMS 2019 held in vila Spain in June 2019 The 19 regular and 14 demo papers presented in this volume were

carefully reviewed and selected from 55 submissions They deal with the application and validation of agent based models methods and technologies in a number of key applications areas including Agronomy and Internet of Things coordination and structure finance and energy function and autonomy humans and societies reasoning and optimization traffic and routing

PRICAI 2002: Trends in Artificial Intelligence Mitsuru Ishizuka,2002-08-07 This book constitutes the refereed proceedings of the 7th Pacific Rim International Conference on Artificial Intelligence PRICAI 2002 held in Tokyo Japan in August 2002 The 57 revised full papers presented together with 5 invited contributions and 26 posters were carefully reviewed and selected from 161 submissions The papers are organized in topical sections on logic and AI foundations representation and reasoning of actions constraint satisfaction foundations of agents foundations of learning reinforcement learning knowledge acquisition and management data mining and knowledge discovery neural network learning learning for robots multi agent applications document analysis Web intelligence bioinformatics intelligent learning environments face recognition and multimedia and emotion **Distributed Computing and Artificial Intelligence** Sigeru Omatu,José Neves,Juan M. Corchado Rodriguez,Juan F Paz Santana,Sara Rodríguez Gonzalez,2013-06-25 The International Symposium on Distributed Computing and Artificial Intelligence 2013 DCAI 2013 is a forum in which applications of innovative techniques for solving complex problems are presented Artificial intelligence is changing our society Its application in distributed environments such as the internet electronic commerce environment monitoring mobile communications wireless devices distributed computing to mention only a few is continuously increasing becoming an element of high added value with social and economic potential in industry quality of life and research This conference is a stimulating and productive forum where the scientific community can work towards future cooperation in Distributed Computing and Artificial Intelligence areas These technologies are changing constantly as a result of the large research and technical effort being undertaken in both universities and businesses The exchange of ideas between scientists and technicians from both the academic and industry sector is essential to facilitate the development of systems that can meet the ever increasing demands of today s society This edition of DCAI brings together past experience current work and promising future trends associated with distributed computing artificial intelligence and their application in order to provide efficient solutions to real problems This symposium is organized by the Bioinformatics Intelligent System and Educational Technology Research Group http bisite usal es of the University of Salamanca The present edition was held in Salamanca Spain from 22nd to 24th May 2013

Parallel Algorithms for Linear Models Erricos Kontoghiorghes,2012-12-06 Parallel Algorithms for Linear Models provides a complete and detailed account of the design analysis and implementation of parallel algorithms for solving large scale linear models It investigates and presents efficient numerically stable algorithms for computing the least squares estimators and other quantities of interest on massively parallel systems The monograph is in two parts The first part consists of four chapters and deals with the computational aspects for solving linear models that have applicability in diverse areas The

remaining two chapters form the second part which concentrates on numerical and computational methods for solving various problems associated with seemingly unrelated regression equations SURE and simultaneous equations models The practical issues of the parallel algorithms and the theoretical aspects of the numerical methods will be of interest to a broad range of researchers working in the areas of numerical and computational methods in statistics and econometrics parallel numerical algorithms parallel computing and numerical linear algebra The aim of this monograph is to promote research in the interface of econometrics computational statistics numerical linear algebra and parallelism

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