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Editors

# **Social Science Microsimulation**



Springer

# Social Science Microsimulation

**Frank Schweitzer**



## **Social Science Microsimulation:**

**Social Science Microsimulation** Klaus G. Troitzsch, 1996-09-17 This book gives an overview of the state of the art in five different approaches to social science simulation on the individual level The volume contains microanalytical simulation models designed for policy implementation and evaluation multilevel simulation methods designed for detecting emergent phenomena dynamical game theory applications the use of cellular automata to explain the emergence of structure in social systems and multi agent models using the experience from distributed artificial intelligence applied to special phenomena The book collects the results of an international conference which brought together social scientists and computer scientists both engaged in a wide range of simulation approaches for the first time Handbook of Spatial Analysis in the Social Sciences Sergio J. Rey, Rachel S. Franklin, 2022-11-18 Providing an authoritative assessment of the current landscape of spatial analysis in the social sciences this cutting edge Handbook covers the full range of standard and emerging methods across the social science domain areas in which these methods are typically applied Accessible and comprehensive it expertly answers the key questions regarding the dynamic intersection of spatial analysis and the social sciences The Social Science Encyclopedia Adam Kuper, 1996 This reference has been written by an international team of contributors presenting a global understanding of the key issues within social sciences A board of advisory editors has worked closely with the editors in determining the most important concepts thinkers and techniques in each field Tools and Techniques for Social Science Simulation Ramzi Suleiman, Klaus G. Troitzsch, Nigel Gilbert, 2012-12-06 The use of computer simulations to study social phenomena has grown rapidly during the last few years Many social scientists from the fields of economics sociology psychology and other disciplines now use computer simulations to study a wide range of social phenomena The availability of powerful personal computers the development of multidisciplinary approaches and the use of artificial intelligence models have all contributed to this development The benefits of using computer simulations in the social sciences are obvious This holds true for the use of simulations as tools for theory building and for its implementation as a tool for sensitivity analysis and parameter optimization in application oriented models In both simulation provides powerful tools for the study of complex social systems especially for dynamic and multi agent social systems in which mathematical tractability is often impossible The graphical display of simulation output renders it user friendly to many social scientists that lack sufficient familiarity with the language of mathematics The present volume aims to contribute in four directions 1 To examine theoretical and methodological issues related to the application of simulations in the social sciences By this we wish to promote the objective of designing a unified user friendly simulation toolkit which could be applied to diverse social problems While no claim is made that this objective has been met the theoretical issues treated in Part 1 of this volume are a contribution towards this objective Handbook of Microsimulation Modelling Cathal O'Donoghue, 2014-11-06 Microsimulation Modelling involves the application of simulation methods to micro data for the purposes of evaluating the

effectiveness and improving the design of public policy The field has been applied to many different policies within both government and academia This handbook describes and discusses the main issues within the field Social science microsimulation Jim Doran,1995 **Spatial Microsimulation: A Reference Guide for Users** Robert Tanton,Kimberley Edwards,2012-11-13 This book is a practical guide on how to design create and validate a spatial microsimulation model These models are becoming more popular as academics and policy makers recognise the value of place in research and policy making Recent spatial microsimulation models have been used to analyse health and social disadvantage for small areas and to look at the effect of policy change for small areas This provides a powerful analysis tool for researchers and policy makers This book covers preparing the data for spatial microsimulation a number of methods for both static and dynamic spatial microsimulation models validation of the models to ensure the outputs are reasonable and the future of spatial microsimulation The book will be an essential handbook for any researcher or policy maker looking to design and create a spatial microsimulation model This book will also be useful to those policy makers who are commissioning a spatial microsimulation model or looking to commission work using a spatial microsimulation model as it provides information on the different methods in a non technical way *Multi-Agent Systems* Adelinde M. Uhrmacher,Danny Weyns,2018-10-08 *Methodological Guidelines for Modeling and Developing MAS Based Simulations* The intersection of agents modeling simulation and application domains has been the subject of active research for over two decades Although agents and simulation have been used effectively in a variety of application domains much of the supporting research remains scattered in the literature too often leaving scientists to develop multi agent system MAS models and simulations from scratch *Multi Agent Systems Simulation and Applications* provides an overdue review of the wide ranging facets of MAS simulation including methodological and application oriented guidelines This comprehensive resource reviews two decades of research in the intersection of MAS simulation and different application domains It provides scientists and developers with disciplined engineering approaches to modeling and developing MAS based simulations After providing an overview of the field s history and its basic principles as well as cataloging the various simulation engines for MAS the book devotes three sections to current and emerging approaches and applications *Simulation for MAS* explains simulation support for agent decision making the use of simulation for the design of self organizing systems the role of software architecture in simulating MAS and the use of simulation for studying learning and stigmergic interaction *MAS for Simulation* discusses an agent based framework for symbiotic simulation the use of country databases and expert systems for agent based modeling of social systems crowd behavior modeling agent based modeling and simulation of adult stem cells and agents for traffic simulation *Tools* presents a number of representative platforms and tools for MAS and simulation including Jason James II SeSAM and RoboCup Rescue Complete with over 200 figures and formulas this reference book provides the necessary overview of experiences with MAS simulation and the tools needed to exploit simulation in MAS for future research in a vast array of

applications including home security computational systems biology and traffic management      Social science microsimulation ,1997      Small Area Estimation and Microsimulation Modeling Azizur Rahman,Ann Harding,2016-11-30

Small Area Estimation and Microsimulation Modeling is the first practical handbook that comprehensively presents modern statistical SAE methods in the framework of ultramodern spatial microsimulation modeling while providing the novel approach of creating synthetic spatial microdata Along with describing the necessary theories and their advantages and limitations the authors illustrate the practical application of the techniques to a large number of substantive problems including how to build up models organize and link data create synthetic microdata conduct analyses yield informative tables and graphs and evaluate how the findings effectively support the decision making processes in government and non government organizations Features Covers both theoretical and applied aspects for real world comparative research and regional statistics production Thoroughly explains how microsimulation modeling technology can be constructed using available datasets for reliable small area statistics Provides SAS codes that allow readers to utilize these latest technologies in their own work This book is designed for advanced graduate students academics professionals and applied practitioners who are generally interested in small area estimation and or microsimulation modeling and dealing with vital issues in social and behavioural sciences applied economics and policy analysis government and or social statistics health sciences business psychology environmental and agriculture modeling computational statistics and data simulation spatial statistics transport and urban planning and geospatial modeling Dr Azizur Rahman is a Senior Lecturer in Statistics and convenor of the Graduate Program in Applied Statistics at the Charles Sturt University and an Adjunct Associate Professor of Public Health and Biostatistics at the University of Canberra His research encompasses small area estimation applied economics microsimulation modeling Bayesian inference and public health He has more than 60 scholarly publications including two books Dr Rahman s research is funded by the Australian Federal and State Governments and he serves on a range of editorial boards including the International Journal of Microsimulation IJM Professor Ann Harding AO is an Emeritus Professor of Applied Economics and Social Policy at the National Centre for Social and Economic Modelling NATSEM of the University of Canberra She was the founder and inaugural Director of this world class Research Centre for more than sixteen years and also a co founder of the International Microsimulation Association IMA and served as the inaugural elected president of IMA from 2004 to 2011 She is a fellow of the Academy of the Social Sciences in Australia She has more than 300 publications including several books in microsimulation modeling      **Practical Microsimulation Modelling** Cathal O'Donoghue,2021-09-23 The purpose of this book is to bring together for the first time a description and examples of the main methods used in microsimulation modelling used in the field of income distribution analysis It is structured to develop and use the different types of models used in the field with a focus on household targeted policy The book aims to provide a greater degree of codified knowledge by providing a practical guide to developing and using microsimulation models At

present the training of researchers and analysts that use and develop microsimulation modelling is done on a relatively ad hoc basis through occasional training programmes and lecture series built around lecture notes Practical Microsimulation Modelling enables a more formalised and organised approach Each chapter addresses a separate modelling approach in a similar consistent way describing in a practical way the key methodological skills for each approach

**Computational Techniques for Modelling Learning in Economics** Thomas Brenner, 2012-12-06 Computational Techniques for Modelling Learning in Economics offers a critical overview of the computational techniques that are frequently used for modelling learning in economics It is a collection of papers each of which focuses on a different way of modelling learning including the techniques of evolutionary algorithms genetic programming neural networks classifier systems local interaction models least squares learning Bayesian learning boundedly rational models and cognitive learning models Each paper describes the technique it uses gives an example of its applications and discusses the advantages and disadvantages of the technique Hence the book offers some guidance in the field of modelling learning in computation economics In addition the material contains state of the art applications of the learning models in economic contexts such as the learning of preference the study of bidding behaviour the development of expectations the analysis of economic growth the learning in the repeated prisoner's dilemma and the changes of cognitive models during economic transition The work even includes innovative ways of modelling learning that are not common in the literature for example the study of the decomposition of task or the modelling of cognitive learning

**Geocomputation** Chris Brunsdon, Alex Singleton, 2015-01-22 Geocomputation is the use of software and computing power to solve complex spatial problems It is gaining increasing importance in the era of the big data revolution of smart cities of crowdsourced data and of associated applications for viewing and managing data geographically like Google Maps This student focused book Provides a selection of practical examples of geocomputational techniques and hot topics written by world leading practitioners Integrates supporting materials in each chapter such as code and data enabling readers to work through the examples themselves Chapters provide highly applied and practical discussions of Visualisation and exploratory spatial data analysis Space time modelling Spatial algorithms Spatial regression and statistics Enabling interactions through the use of neogeography All chapters are uniform in design and each includes an introduction case studies conclusions drawing together the generalities of the introduction and specific findings from the case study application and guidance for further reading This accessible text has been specifically designed for those readers who are new to Geocomputation as an area of research showing how complex real world problems can be solved through the integration of technology data and geocomputational methods This is the applied primer for Geocomputation in the social sciences

**Political Disagreement** Robert Huckfeldt, Paul E. Johnson, John Sprague, 2004-07-12 Political disagreement is widespread within the communication network of ordinary citizens furthermore political diversity within these networks is entirely consistent with a theory of democratic politics built on the importance of individual interdependence The persistence

of political diversity and disagreement does not imply that political interdependence is absent among citizens or that political influence is lacking The book's analysis makes a number of contributions The authors demonstrate the ubiquitous nature of political disagreement They show that communication and influence within dyads is autoregressive that the consequences of dyadic interactions depend on the distribution of opinions within larger networks of communication They argue that the autoregressive nature of political influence serves to sustain disagreement within patterns of social interaction as it restores the broader political relevance of social communication and influence They eliminate the deterministic implications that have typically been connected to theories of democratic politics based on interdependent citizens **Cosmos 2008** Susan

Stepney, Fiona Polack, Peter Welch, 2008-09 The study of Complex Systems is growing rapidly and modelling and simulation tools are an important part of the process This volume brings together work from a multidisciplinary group of scientists from biology and computer science who are studying a variety of techniques and applications for modelling and simulating complex systems A common theme emerging from much of this work is an emphasis on validation how one can have confidence that a computer simulation is saying something sensible about the complex real world domain of interest

**Handbook of Planning Support Science** Stan Geertman, John Stillwell, 2020-02-28 Encompassing a broad range of innovative studies on planning support science this timely Handbook examines how the consequences of pressing societal challenges can be addressed using computer based systems Chapters explore the use of new streams of big and open data as well as data from traditional sources offering significant critical insights into the field *Self-Organization of Complex*

*Structures* Frank Schweitzer, 1997-07-16 During the past twenty years a broad spectrum of theories and methods have been developed in physics chemistry and molecular biology to explain structure formation in complex systems These methods have been applied to many different fields such as economics sociology and town planning and this book reflects the interdisciplinary nature of complexity and self organisation The main focus is on the emergence of collective phenomena from individual or microscopic interactions Presents a wide ranging overview from fundamental aspects of the evolution of complexity to applications in biology ecology sociology economics and urban structure formation **From Theory to**

**Practice in Multi-Agent Systems** Barbara Dunin-Keplicz, Edward Nawarecki, 2003-08-03 This volume contains the papers selected for presentation at CEEMAS 2001 The workshop was the fourth in a series of international conferences devoted to autonomous agents and multi agent systems organized in Central Eastern Europe Its predecessors were CEEMAS 99 and DAIMAS 97 which took place in St Petersburg Russia as well as DIMAS 95 which took place in Cracow Poland Organizers of all these events made efforts to make them wide open to participants from all over the world This would have been impossible without some help from friendly centers in the Czech Republic England France Japan and The Netherlands DIMAS 95 featured papers from 15 countries while CEEMAS 99 from 18 countries A total of 61 papers were submitted to CEEMAS 2001 from 17 countries Out of these papers 31 were selected for regular presentation while 14 were qualified as posters The

motto of the meeting was Diversity is the core of multi agent systems This variety of subjects was clearly visible in the CEEMAS 2001 program addressing the following major areas of multi agent systems Organizations and social aspects of multi agent systems Agent and multi agent system architectures models and formalisms Communication languages protocols and negotiation Applications of multi agent systems Agent and multi agent development tools Theoretical foundations of DistributedAI Learning in multi agent systems The richness of workshop subjects was ensured thanks to the CEEMAS 2001 contributing authors as well as the keynote speakers **Transportation Systems Planning** Konstadinos G.

Goulias,2002-12-26 Transportation engineering and transportation planning are two sides of the same coin aiming at the design of an efficient infrastructure and service to meet the growing needs for accessibility and mobility Many well designed transport systems that meet these needs are based on a solid understanding of human behavior Since transportation systems are the backbone connecting the vital parts of a city in depth understanding of human nature is essential to the planning design and operational analysis of transportation systems With contributions by transportation experts from around the world Transportation Systems Planning Methods and Applications compiles engineering data and methods for solving problems in the planning design construction and operation of various transportation modes into one source It is the first methodological transportation planning reference that illustrates analytical simulation methods that depict human behavior in a realistic way and many of its chapters emphasize newly developed and previously unpublished simulation methods The handbook demonstrates how urban and regional planning geography demography economics sociology ecology psychology business operations management and engineering come together to help us plan for better futures that are human centered The text reviews projects from an initial problem statement to final policy action and associated decision making and examines policies at all levels of government from the city to the national levels Unlike many other handbooks which are encyclopedic reviews Transportation Systems Planning extends far beyond modeling in engineering and economics to present a truly transdisciplinary approach to transportation systems planning New Pathways in Microsimulation Gijs Dekkers,Marcia Keegan,2016-04-29 Microsimulation as a modelling tool in social sciences has increased in importance over the last few decades Once restricted to a handful of universities and government departments as a scientific field it has achieved a new dynamism during the last decade As computing power increases and data availability becomes more widespread microsimulation models can be put to hitherto unprecedented uses Edited by leading experts in the field this book illustrates recent advances methodologies and uses of socioeconomic microsimulation in social sciences around the world It does so by analysing new grounds covered in microsimulation and exploring new applications in traditional fields As such the chapters grouped into five sections new methods and methodology pensions financial crisis and austerity measures health and poverty present recent innovative and challenging work in various fields that is not just relevant for those in that field but that might also inspire scholars from the other disciplines to broaden their minds to new and exciting uses of this



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