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# Arrovian Aggregation Models

**Dan S. Felsenthal, Hannu Nurmi**



## **Arrovian Aggregation Models:**

*Arrovian Aggregation Models* Fuad T. Aleskerov, 2013-06-29 Aggregation of individual opinions into a social decision is a problem widely observed in everyday life For centuries people tried to invent the best aggregation rule In 1951 young American scientist and future Nobel Prize winner Kenneth Arrow formulated the problem in an axiomatic way i e he specified a set of axioms which every reasonable aggregation rule has to satisfy and obtained that these axioms are inconsistent This result often called Arrow s Paradox or General Impossibility Theorem had become a cornerstone of social choice theory The main condition used by Arrow was his famous Independence of Irrelevant Alternatives This very condition pre defines the local treatment of the alternatives or pairs of alternatives or sets of alternatives etc in aggregation procedures Remaining within the framework of the axiomatic approach and based on the consideration of local rules Arrovian Aggregation Models investigates three formulations of the aggregation problem according to the form in which the individual opinions about the alternatives are defined as well as to the form of desired social decision In other words we study three aggregation models What is common between them is that in all models some analogue of the Independence of Irrelevant Alternatives condition is used which is why we call these models Arrovian aggregation models Chapter 1 presents a general description of the problem of axiomatic synthesis of local rules and introduces problem formulations for various versions of formalization of individual opinions and collective decision Chapter 2 formalizes precisely the notion of rationality of individual opinions and social decision Chapter 3 deals with the aggregation model for the case of individual opinions and social decisions formalized as binary relations Chapter 4 deals with Functional Aggregation Rules which transform into a social choice function individual opinions defined as choice functions Chapter 5 considers another model Social Choice Correspondences when the individual opinions are formalized as binary relations and the collective decision is looked for as a choice function Several new classes of rules are introduced and analyzed [Handbook of Social Choice and Welfare](#) Kenneth J. Arrow, A. Sen, Kotaro Suzumura, 2010-10-13 This second part of a two volume set continues to describe economists efforts to quantify the social decisions people necessarily make and the philosophies that those choices define Contributors draw on lessons from philosophy history and other disciplines but they ultimately use editor Kenneth Arrow s seminal work on social choice as a jumping off point for discussing ways to incentivize punish and distribute goods Develops many subjects from Volume 1 2002 while introducing new themes in welfare economics and social choice theory Features four sections Foundations Developments of the Basic Arrovian Schemes Fairness and Rights and Voting and Manipulation Appeals to readers who seek introductions to writings on human well being and collective decision making Presents a spectrum of material from initial insights and basic functions to important variations on basic schemes **Axiomatic Consensus Theory in Group Choice and Biomathematics** William H. E. Day, F. R. McMorris, 2003-01-01 A unique comprehensive review of axiomatic consensus theory in biomathematics as it has developed over the past 30 years *Limit Theorems and Applications of Set-Valued and*

*Fuzzy Set-Valued Random Variables* Shoumei Li,Y. Ogura,V. Kreinovich,2013-04-17 After the pioneering works by Robbins 1944 1945 and Choquet 1955 the notation of a set valued random variable called a random closed set in literatures was systematically introduced by Kendall 1974 and Matheron 1975 It is well known that the theory of set valued random variables is a natural extension of that of general real valued random variables or random vectors However owing to the topological structure of the space of closed sets and special features of set theoretic operations of Beer 27 set valued random variables have many special properties This gives new meanings for the classical probability theory As a result of the development in this area in the past more than 30 years the theory of set valued random variables with many applications has become one of new and active branches in probability theory In practice also we are often faced with random experiments whose outcomes are not numbers but are expressed in inexact linguistic terms

**Computational Models of Argument** Bart Verheij,Stefan Szeider,Stefan Woltran,2012 The subject of argumentation has been studied since ancient times but it has seen major innovations since the advent of the computer age Software already exists which can create and evaluate arguments in high stake situations such as medical diagnosis and criminal investigation formal systems can help us appreciate the role of the value judgments which underlie opposing positions and it is even possible to enter into argumentative dialogues as if playing a computer game This book presents the 28 full papers 17 short papers and a number of system demonstrations described in an extended abstract from the 2012 biennial Computational Models of Argument COMMA conference held in Vienna Austria Papers by the invited speakers Professor Trevor Bench Capon Professor Erik Krabbe and Professor Keith Stenning are also included This year for the first time COMMA invited the submission of papers for an innovative applications track and those which were accepted for presentation are included in this volume Argumentation can be studied from many angles including the artificial natural and theoretical systems perspective Presentations at the 2012 conference addressed the subject from these perspectives and many more

*Soft Computing Applications for Group Decision-making and Consensus Modeling* Mikael Collan,Janusz Kacprzyk,2017-06-30 This book offers a concise introduction and comprehensive overview of the state of the art in the field of decision making and consensus modeling with a special emphasis on fuzzy methods It consists of a collection of authoritative contributions reporting on the decision making process from different perspectives from psychology to social and political sciences from decision sciences to data mining and from computational sciences in general to artificial and computational intelligence and systems Written as a homage to Mario Fedrizzi for his scholarly achievements creative ideas and long lasting services to different scientific communities it introduces key theoretical concepts describes new models and methods and discusses a range of promising real world applications in the field of decision making science It is a timely reference guide and a source of inspiration for advanced students and researchers

Scalable Uncertainty Management Florence Dupin de Saint-Cyr,Meltem Öztürk-Escoffier,Nico Potyka,2022-10-14 This book constitutes the refereed proceedings of the 15th International Conference

on Scalable Uncertainty Management SUM 2022 which was held in Paris France in October 2022 The 19 full and 4 short papers presented in this volume were carefully reviewed and selected from 25 submissions Besides that the book also contains 3 abstracts of invited talks and 2 tutorial papers The conference aims to gather researchers with a common interest in managing and analyzing imperfect information from a wide range of fields such as artificial intelligence and machine learning databases information retrieval and data mining the semantic web and risk analysis The chapter Defining and Enforcing Descriptive Accuracy in Explanations the Case of Probabilistic Classifiers is licensed under the terms of the Creative Commons Attribution 4.0 International License

Monotonicity Failures Afflicting Procedures for Electing a Single Candidate Dan S. Felsenthal, Hannu Nurmi, 2017-02-08 This book provides an evaluation of 18 voting procedures in terms of the most important monotonicity related criteria in fixed and variable electorates All voting procedures studied aim at electing one out of several candidates given the voters preferences over the candidates In addition to strict monotonicity failures the vulnerability of the procedures to variation of the no show paradoxes is discussed All vulnerabilities are exemplified and explained The occurrence of the no show paradoxes is related to the presence or absence of a Condorcet winner The primary readership of this book are scholars and students in the area of social choice

**A Course in Mathematical and Statistical Ecology** Anil Gore, S.A. Paranjpe, 2013-04-17 As the world enters the new millennium mankind faces a series of new problems many of them created by man himself These include overpopulation air and water pollution global warming accumulation of greenhouse gases damage to the ozone layer and loss of biodiversity Perhaps these problems were around even earlier in an incipient stage but they have now assumed global proportions and are uppermost in the minds of all A natural consequence is enhanced interest in sciences connected with these problems Ecology is a field that is immensely useful in understanding many of them In the seventies nature conservation became a concern of wide sections of society well beyond the small group of expert ecologists Species extinction and depletion of biological resources were seen as major threats to human welfare It was therefore natural for scientists from different disciplines to seek reasons behind these developments We were no exceptions and when opportunity to interact with ecologists as statistical consultants came we found ourselves reading more and more of ecology and evolutionary biology Several years ago we proposed starting of an elective one semester course on statistical ecology for graduate students of statistics of Pune University

**Intelligent and Fuzzy Systems** Cengiz Kahraman, Irem Ucal Sari, Basar Oztaysi, Selcuk Cebi, Sezi Cevik Onar, A. Çağrı Tolga, 2023-08-16 This book consists of the papers accepted after a careful review process at an international scientific meeting where the latest developments on intelligent and fuzzy systems are presented and discussed The latest developments in both the theoretical and practical fields of the new fuzzy set extensions have been prepared by expert researchers Contributed by participants from more than 40 different countries this book is also a useful resource in terms of showing the levels that fuzzy and intelligent systems have reached in various countries of the world The intended readers are

intelligent and fuzzy systems researchers lecturers M Sc and Ph D students studying fuzzy sets and artificial intelligence The book covers fuzzy logic theory and applications heuristics and metaheuristics from optimization to machine learning from quality management to risk management making the book an excellent source for researchers *Philosophy of Economics*, 2012-04-23 Part of the Handbook of the Philosophy of Science Series edited by Dov M Gabbay King's College London UK Paul Thagard University of Waterloo Canada and John Woods University of British Columbia Canada *Philosophy of Economics* investigates the foundational concepts and methods of economics the social science that analyzes the production distribution and consumption of goods and services This groundbreaking collection the most thorough treatment of the philosophy of economics ever published brings together philosophers scientists and historians to map out the central topics in the field The articles are divided into two groups Chapters in the first group deal with various philosophical issues characteristic of economics in general including realism and Lakatos explanation and testing modeling and mathematics political ideology and feminist epistemology Chapters in the second group discuss particular methods theories and branches of economics including forecasting and measurement econometrics and experimentation rational choice and agency issues game theory and social choice behavioral economics and public choice geographical economics and evolutionary economics and finally the economics of scientific knowledge This volume serves as a detailed introduction for those new to the field as well as a rich source of new insights and potential research agendas for those already engaged with the philosophy of economics Provides a bridge between philosophy and current scientific findings Encourages multi disciplinary dialogue Covers theory and applications *Beliefs, Interactions and Preferences* Mark J. Machina, Bertrand Munier, 2013-03-09 *Beliefs Interactions and Preferences in Decision Making* mixes a selection of papers presented at the Eighth Foundations and Applications of Utility and Risk Theory FUR VIII conference in Mons Belgium together with a few solicited papers from well known authors in the field This book addresses some of the questions that have recently emerged in the research on decision making and risk theory In particular authors have modeled more and more as interactions between the individual and the environment or between different individuals the emergence of beliefs as well as the specific type of information treatment traditionally called rationality This book analyzes several cases of such an interaction and derives consequences for the future of decision theory and risk theory In the last ten years modeling beliefs has become a specific sub field of decision making particularly with respect to low probability events Rational decision making has also been generalized in order to encompass in new ways and in more general situations than it used to be fitted to multiple dimensions in consequences This book deals with some of the most conspicuous of these advances It also addresses the difficult question to incorporate several of these recent advances simultaneously into one single decision model And it offers perspectives about the future trends of modeling such complex decision questions The volume is organized in three main blocks The first block is the more traditional one It deals with new extensions of the existing theory as is always demanded by scientists in the field A second block handles specific

elements in the development of interactions between individuals and their environment as defined in the most general sense. The last block confronts real world problems in both financial and non financial markets and decisions and tries to show what kind of contributions can be brought to them by the type of research reported on here      **The Future of Economic Design** Jean-François Laslier, Hervé Moulin, M. Remzi Sanver, William S. Zwicker, 2019-11-15 This collection of essays represents responses by over eighty scholars to an unusual request give your high level assessment of the field of economic design as broadly construed Where do we come from Where do we go from here The book editors invited short informal reflections expressing deeply felt but hard to demonstrate opinions unsupported speculation and controversial views of a kind one might not normally risk submitting for review The contributors both senior researchers who have shaped the field and promising younger researchers responded with a diverse collection of provocative pieces including retrospective assessments or surveys of the field opinion papers reflections on critical points for the development of the discipline proposals for the immediate future science fiction and many more The readers should have fun reading these unusual pieces as much as the contributors enjoyed writing them      **Theory of Social Choice on Networks** Wynn C. Stirling, 2016-09-22 This highly original book challenges social choice theory by arguing for the importance of dynamic preferences and context in understanding important social phenomena      Computational Logic in Multi-Agent Systems Nils Bulling, Leendert van der Torre, Serena Villata, Wojtek Jamroga, Wamberto Vasconcelos, 2014-07-21 This book constitutes the proceedings of the 15th International Workshop on Computational Logic in Multi Agent Systems CLIMA XV held in Prague Czech Republic in August 2014 The 12 regular papers were carefully reviewed and selected from 20 submissions The purpose of the CLIMA workshops is to provide a forum for discussing techniques based on computational logic for representing programming and reasoning about agents and multi agent systems in a formal way This edition will feature two special sessions logics for agreement technologies and logics for games strategic reasoning and social choice      Mathematical Reviews , 2007      Collective Wisdom Hélène Landemore, Jon Elster, 2012-07-16 The contributors to this volume discuss and for the most part challenge whether many minds can be wiser than one      **Бинарные отношения, графы и коллективные решения** Фуад Алескеров, Элла Хабина, Дмитрий Шварц, 2016-01-27      **Collective Decision-Making:** Norman Schofield, 2013-03-09 In the last decade the techniques of social choice theory game theory and positive political theory have been combined in interesting ways so as to provide a common framework for analyzing the behavior of a developed political economy Social choice theory itself grew out of the innovative attempts by Kenneth Arrow 1951 and Duncan Black 1948 1958 to extend the range of economic theory in order to deal with collective decision making over public goods Later work by William Baumol 1952 and James Buchanan and Gordon Tullock 1962 focussed on providing an economic interpretation of democratic institutions In the same period Anthony Downs 1957 sought to model representative democracy and elections while William Riker 1962 made use of work in cooperative game theory by John von Neumann and Oscar Morgenstern 1944 to study

coalition behavior In my view these rational choice analyses of collective decision making have their antecedents in the arguments of Adam Smith 1759 1776 James Madison 1787 and the Marquis de Condorcet 1785 about the design of political institutions In the introductory chapter to this volume I briefly describe how some of the current normative and positive aspects of social choice date back to these earlier writers      *Group Verbal Decision Analysis* Alexey B. Petrovsky, 2023-03-14

This book describes an original approach to solving tasks of individual and collective choice classification ranking and selection of multi attribute objects Object representation with multisets allows considering simultaneously numerical and symbolic variables In group verbal decision analysis judgments of all participants are taken into account without a compromise between contradictory Natural language is used to describe problems and objects formalize knowledge of experts and preferences of decision makers and explain results Verbal methods and technologies are more transparent less laborious for a person and weakly sensitive to measurement errors The book also includes examples of applying new tools in real ill structured high dimensional choice tasks It is intended for researchers managers consultants analysts and developers as well as for teachers and students of applied mathematics computer science information processing engineering economics and management



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