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Proposals for publication should be sent to

LNCS/LNAI Editorial, Tiergartenstr. 17, 69121 Heidelberg, Germany

E-mail: lncs@springer.com

ISSN 0302-9743

ISBN 978-3-642-15163-7



springer.com

Lecture Notes in
Artificial Intelligence

Lecture Notes in Computer Science

Bonanno • Löwe • van der Hoek (Eds.)



LNAI 6006

LNAI
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Logic and the Foundations of Game
and Decision Theory – LOFT 8

LOFT



LOFT
2008

Giacomo Bonanno
Benedikt Löwe
Wiebe van der Hoek (Eds.)

Logic and the Foundations of Game and Decision Theory – LOFT 8

8th International Conference, LOFT 8 2008
Amsterdam, The Netherlands, July 2008
Revised Selected Papers



Springer

T · L · G

Texts in Logic and Games



Giacomo Bonanno Benedikt Löwe
Wiebe van der Hoek (Eds.)

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Library of Congress Control Number: 2010932134

CR Subject Classification (1998): F.3, F.4.1, G.2, F.1, H.3, I.2.3

LNCS Sublibrary: SL 7 – Artificial Intelligence

ISSN 0302-9743
ISBN-10 3-642-15163-9 Springer Berlin Heidelberg New York
ISBN-13 978-3-642-15163-7 Springer Berlin Heidelberg New York

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Printed in Germany

Typesetting: Camera-ready by author, data conversion by Scientific Publishing Services, Chennai, India
Printed on acid-free paper 06/3180 5 4 3 2 1 0

Preface

This volume in the *Texts in Logic and Games* series is conceived as a ramification of the seventh conference on *Logic and the Foundations of the Theory of Games and Decisions* (LOFT8), which took place in Amsterdam, in July 2008. 61 papers were submitted to this event, of which 48 were presented. This volume is based on a selection of the presented papers and the invited talks: they survived a thorough and lengthy reviewing process.

The LOFT conferences are a regular biannual event since 1994. The first conference was hosted by the Centre International de Recherches Mathématiques in Marseille (France), the next four took place at the International Centre for Economic Research in Torino (Italy), the sixth conference was hosted by the Graduate School of Management in Leipzig (Germany) the seventh took place at the University of Liverpool (United Kingdom) and LOFT8 was organised at the ILLC in Amsterdam.¹

The LOFT conferences are interdisciplinary events that bring together researchers from a variety of fields: computer science, economics, game theory, linguistics, logic, multi-agent systems, psychology, philosophy, social choice and statistics. Its focus is on the general issue of rationality and agency. In the last decade, there has been a flourishing activity in exactly the kind of areas that LOFT aims to address, which is demonstrated by not only the number of submissions to LOFT8, but also the fact that the conference is becoming more and more a home for a large group of researchers, rather than a host for passers by from different disciplines.

The papers collected in this volume reflect the contemporary interests and interdisciplinary scope of the LOFT conferences.

Dietmar Berwanger opens this volume with a paper on *Infinite Coordination Games*. He investigates the prescriptive power of sequential iterated admissibility in coordination games of the Gale-Stewart style, i.e., perfect information games of infinite duration with only two payoffs. Such infinite games are interesting,

¹ Collections of papers from previous LOFT conferences can be found in a special issue of *Theory and Decision* (Vol. 37, 1994, edited by M. Bacharach and P. Mongin), the volume *Epistemic logic and the theory of games and decisions* (edited by M. Bacharach, L.-A. Gérard-Varet, P. Mongin and H. Shin and published by Kluwer Academic, 1997), two special issues of *Mathematical Social Sciences* (Vols. 36 and 38, 1998, edited by G. Bonanno, M. Kaneko and P. Mongin), two special issues of *Bulletin of Economic Research* (Vol. 53, 2001 and Vol. 54, 2002, edited by G. Bonanno and W. van der Hoek), a special issue of *Research in Economics*, (Vol. 57, 2003, edited by G. Bonanno and W. van der Hoek), a special issue of *Knowledge, Rationality and Action* (part of *Synthese*, Vol. 147, 2005, edited by G. Bonanno) and the volume *Logic and the Foundations of Game and Decision Theory* (LOFT 7) edited by G. Bonanno, W. van der Hoek and M. Wooldridge, *Texts in Logic and Games* No 3, AUP, 2007.

because they provide a natural model for non-terminating interactive computation, for instance. Berwanger shows that, on the kind of games described, the procedure of eliminating weakly dominated strategies is independent of the elimination order and that, under so-called maximal simultaneous elimination, this procedure converges after at most ω many steps.

In *Conditioning by Minimizing Accessibility*, Konstantinos Georgatos presents an axiomatization of a class of set-theoretic conditional operators. Conditionals use a notion of ‘closeness to a world’, often based on a local notion of distance, parameterised by worlds. Georgatos, however, is interested in a *global* distance notion, of which the hamming distance between valuations is an example. The purpose of the paper is to introduce and characterise a class of conditional operators that are modelled by a global distance. The idea here is to assume a binary relation of indistinguishability between states, and associate the global distance with the number of steps it takes to go from one state to the other. Using this global map of indistinguishability, one can define and characterise belief revision and update operators.

The paper *Correspondences in the Theory of Aggregation*, reports on an analysis by Davide Grossi of the interrelationship between the social-theoretic problems of preferences and judgment aggregation from a formal logic perspective. The study reveals that on the one hand, preference aggregation on total preorders is equivalent to the aggregation of specific types of judgments. On the other hand, judgment aggregation on propositional logic is proven equivalent to the aggregation of specific types of preferences. This indicates that aggregation of preferences and of judgments can be viewed as two faces of the same coin.

In *Logic and Data Exchange: Which Solutions are “Good” Solutions?* André Hernich and Nicole Schweikhardt introduce the area of data exchange, which is concerned with translating data that is structured in one format to data structured in a new format. A solution is then a database that does this translation, given a database and some conditions that should hold between the source and target database. They focus on good solutions for query answering on the target database, in particular universal solutions, the core of the universal solutions, and CWA-solutions. They also present a game theoretic characterisation of the CWA-solutions.

As the title suggests, *Preference change triggered by belief change: a principled approach* by Jérôme Lang and Leendert van der Torre is about preference change: the authors introduce eight properties for preferences evolving after some new fact has been learned. Four properties are concerned with persistence of preferences when something that was preferred is (partly) satisfied or dissatisfied, four other properties regard situations where the agent learns something she already suspected to hold. They then define a family of preference change operators, parameterised by a revision function on epistemic states, and they give semantic conditions on those change operators and revision function for each of those eight conditions to hold.

Riccardo Pucella and Mehrnoosh Sadrzadeh present a ‘runs-and-systems semantics for logics of announcements’ in a paper with exactly that title. Rather

than using updateable Kripke models as a semantics for logics of announcements, they provide a semantics based on runs in a system, a semantics known from the interpreted systems literature. This alternative semantics is more concrete and better suited to accurately model a given scenario. They then study notions like honesty of an announcement (meaning its contents is true) and belief of the agents when announcements are not public, i.e., need not be broadcast to all agents in the system.

In *From Nash to Dependency Equilibria* Wolfgang Spohn challenges the assumptions underlying the Nash equilibrium concerning the causal independence of the decisions and the actions of the players. Although Spohn acknowledges that independence of the actions is constitutive of normal form games, he argues that the independence of the decisions may and should be given up. This then leads to the wider and quite different notion of a dependency equilibrium, of which cooperation in the single-shot prisoners' dilemma is an example. The paper argues that this notion of dependency equilibrium is meaningful and significant, and it sketches some of its consequences.

Where Pucella and Sadrzadeh relate dynamic epistemic logic with a temporal logic for knowledge in their paper, Johan van Benthem and Cédric Dégrémont try to connect logics for the dynamics of belief with existing temporal logic approaches for belief. In their paper *Multi-agent belief dynamics: bridges between dynamic doxastic and doxastic temporal logics* they focus on dynamic logics for changing beliefs using plausibility relations between worlds to represent agents' beliefs and conditional beliefs and try to relate them to models of doxastic temporal logic. They identify crucial agent features behind dynamic doxastic belief revision, and position them inside the broader temporal setting.

In *Multi-Agent Belief Revision with Linked Preferences*, Jan van Eijck and Floor Sietsma establish a connection between dynamic epistemic logics of belief revision and approaches to collective judgment and multi-agent preference change. They first define an abstract propositional dynamic logic (PDL) style framework in which one can reason about preferences. They then focus on a central property of preferences, called *linkedness*, that roughly says that if two alternatives are each ranked with respect to a third alternative, it should be possible to rank (or compare) the two as well. They give a criterion under which linkedness is preserved under belief change. The paper then demonstrates how the logic can be used to model consensus seeking procedures, focusing on so-called plenary Dutch meetings.

In their *Note on Assumption-Completeness in Modal Logic*, Johathan Zvesper and Eric Pacuit come up with a positive result in the following question. Since in a game, players reason about (others') beliefs, the question arises whether there exists such a thing as the space of all possible beliefs. For their analysis, they identify a belief with an 'assumption', which is the characterisation of what an agent exactly believes in the sense that it implies all its (other) beliefs. Now, roughly, a belief model is assumption complete for a language of agent Ann, if for every sentence of this language, it is possible that Bob exactly believes that sentence. Now, a negative result in the first-order language literature says that

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there are no assumption-complete models for this language. However, the result of Zvesper and Pacuit says that for the modal logic language, there *do* exist assumption-complete models.

We thank all the authors for their input and their patience, and we thank the reviewers for all their carefully written reports and suggestions.

October 2009

Giacomo Bonanno
Benedikt Löwe
Wiebe van der Hoek
General Chairs LOFT 2008

Organization

LOFT 2008 was organised by the Institute for Logic, Language and Computation (ILLC), University of Amsterdam. The General Chairs would like to thank the sponsors (see below) for their generous support and the programme committee (also listed below) for their input during the refereeing of the submissions. Special thanks go to Peter van Ormondt and Sanchit Saraf for their support during the organization of the conference.

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LOFT 2008 was hosted by the Institute for Logic, Language and Computation (ILLC) of the *Universiteit van Amsterdam*, and was funded by the *Neder-*

landse Organisatie voor Wetenschappelijk Onderzoek (NWO, DN 612.080.000 CN 2008/0557 0/EW) and by the Marie Curie Research Training Site GLoRiClass (“**G**ames in **L**ogic **R**eaching out to **C**lassical game theory”; MEST-CT-2005-020841).

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