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Preface

This volume contains papers presented at the Poznań Reasoning Week (PRW; https://poznanreasoningweek.wordpress.com/) multi-conference held in Poznań in September 11–15, 2018. PRW aims at bringing together experts, whose research offers a broad range of perspectives on systematic analyses of reasoning processes and their formal modelling. The 2018 edition consisted of three conferences, which addressed the following topics: (i) games in reasoning research, (ii) the interplay of logic and cognition, and (iii) refutation systems. The papers collected in this volume address all these topics.

Starting with games in reasoning research, the volume opens with the paper entitled *On two simple models for one simple game: 'Guess Who?', Inferential Erotetic Logic, and situational semantics* by Mariusz Urbański and Joanna Grzelak. Here we find a model for playing 'Guess Who?' game, developed within the framework of Inferential Erotetic Logic, subsequently refined in terms of situational semantics. The paper introduces the concept of discriminatory power of a polar question. Next paper by Agata Tomczyk: *Natural Deduction Method for Solving CL-based Puzzles*, presents a formal way of solving Smullyan's Combinatory logic-based puzzles by way of Curry-Howard isomorphism. The approach is formalized in natural deduction-style and uses unmodified and type-free combinators. Solving a puzzle is understood as creating a proof for a given formula, starting with a set of pre-assumed conditions.

Moving to the interplay between logic and cognition: the paper by Paula Álvarez-Merino, Carmen Requena, and Francisco Salto entitled *The Measurement of Factive Deductivity: a Psychological and Cerebral Review* presents a systematic review of psychometrical and neural tests, which were carried out in search for measures to empirically confirm or refute the Factive Deduction Hypothesis. Authors identify 27 psychometrical and 58 neural measures in their review. Emmanuelle-Anna Dietz Saldanha and Richard Mörbitz in *Cognitive Principles and Individual Differences in Human Syllogistic Reasoning* address the problem of human syllogistic reasoning and its formal modelling. The authors claim that an adequate cognitive theory of such a reasoning should aim at modeling individual differences among reasoners, if they are observed. They re-assess a novel approach based on the Weak Completion Semantics, Clustering by Principles, that addresses these differences. In *Acceptable propositional*

normal logic programs checking procedure implementation Aleksandra Czyż, Kinga Ordecka and Andrzej Gajda propose solutions for three main issues that increase the computational cost of checking, if a given logic program is acceptable and present an implementation of the procedure written in Haskell programming language. Tomasz Witczak in *Propositional logic with probability operators (based on general ideas of weak modal calculus)* aims at establishing propositional calculus based on classical or intuitionistic core and equipped with probability operators.

In *Let Me Ask You an Easier Question – Modifying and Rephrasing Questions in Information Seeking Dialogues* by Paweł Łupkowski the author explores and analyses how questions are modified and rephrased in the information seeking dialogues in order to facilitate the answering process.

The next two papers apply description logic for constructing ontologies useful for analyses of human reasoning processes. Adrian Groza in his paper *Interleaved Argumentation and Explanation in Dialog* uses description logics in order to model argumentation and explanation. Description logics allow for defining the ontologies of the agents and also for distinguishing arguments from explanations. Farshad Badie in *A Formal Ontology for Conception Representation in Terminological Systems* applies description logics in order to offer a formal ontology for conception representation in terminological systems. This ontology specifies the conceptualisation of humans' conceptions as well as of the effects of their conceptions on the world.

The last four papers in this volume address issues related to refutation systems. In *What is refutation ?* Gabriele Pulcini and Tomasz Skura present a logical analysis of the concept of refutation and illustrate some possible directions of research in the field of philosophical logic as well as in the methodology of propositional calculi. Valentin Goranko and Tomasz Skura in the paper *Refutation systems in the finite* present some refutation systems on finite semantic structures and establish some basic facts about them. In particular, the authors develop generic refutation systems for modal logics and for first-order theories that are semantically determined by single finite structures or by classes of finite structures, for arbitrary first-order languages. Andrzej Wiśniewski characterises a sequent calculus for holistically inconsistent sets of well formed formulas of Classical Propositional Logic in *Towards a Uniform Account of Proofs and Refutations*. A uniform method for constructing sequent-style rejection calculi for any given propositional finitely many-valued logic defined by means of a truth-functional semantics is proposed by Mihail Bogojeski and Hans Tompits in the paper entitled *On Sequent-Type Rejection Calculi for Many-Valued Logics*.

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