Preface

Rudolf Berghammer, Bernhard Möller, Michael Winter

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Relation Algebra was introduced for compacting first-order logic formulas, by eliminating certain quantifiers, into *point-free* form that is amenable to simple algebraic manipulation, i.e., (in)equational reasoning. But there are many other forms of point-free calculi, starting probably with the calculus of matrices and algebra of sets and continuing with lattice theory, categories and allegories, or semirings and their relatives, including Kleene Algebra and other structures with constructs for iteration.

Over the recent years, the series *RAMiCS — Relational and Algebraic Methods in Computer Science* of conferences has successfully brought together researchers on the theory and applications of these kinds of algebraic approaches approaches. This year Gunther Schmidt, one of the founders and central figures of the RAMiCS conferences will turn 75. Without him the field would by far not be as advanced as it is today, both technically and concerning its international interconnection. This is most gratefully and repectfully acknowledged by the RAMiCS community, who therefore wants to honour him with a Festschrift in the form of this current special issue of the Journal JLAP (which has already benevolently accompanied the RAMiCS efforts for many years).

The issue starts with a paper by A. Amstrong, G. Struth and T. Weber on *Programming and automating mathematics in the Tarski-Kleene hierarchy.*

Next, R. Berghammer shows both theory and the RELVIEW system at work in *Computing minimal extending sets by relation-algebraic modelling and development.*

The following paper is by R. Berghammer, A. Rusinowska, H. de Swart and deals with a more application-oriented topic, namely *Spatial voting games, relation algebra and* RELVIEW.

Then the paper *Exploring modal worlds* by H.-H. Dang, R. Glck, B. Mller, P. Roocks and A. Zelend provides a round-trip through semiring-based modal algebra. The idea is to cover topics as varied as ... in a unified formal manner.

This is followed by a more theoretical article by J. Desharnais, A. Grinenko, B. Mller on *Relational style laws and constructs of linear algebra.*

Next, I. Dntsch and E. Orlowska study *Discrete dualities for some algebras with relations.*

A truly multi-author paper *Inference engine based on closure and join operators over truth table binary relations* on practical applications is presented by S. Elloumia, B. Boulifaa, A. Jaoua, M. Saleha, J. Al Otaibia and M. Fríias.

After that we are taken to the field of program semantics by W. Guttmann in his paper *Multirelations with infinite computations.*

An unorthodox application of the algebraic concept of semirings to the description and analysis of routing protocols is presented by P. Hfner and A. McIver in *Hopscotch - Reaching the target hop by hop.*

The next contribution is by W. Kahl and deals with *Mouldable Code" via nested code graph transformations.*

This is followed by another more theoretical paper by R. Maddux on *Arrow's theorem for incomplete relations.*

A combination of theory and application is given by J. Oliveira with *A relation-algebraic approach to the "Hoare logic" of functional dependencies.*

Another more theoretic approach is presented by N. Tsumagari, H. Furusawa and Y. Kawahara in their article *Relations into algebras of Probabilistic Distributions.*

At the end of the technical par of the issue, all the algebra shown before is supplemented by yet a different kind in *Relational properties of sequential composition of co-algebras* by M. Winter and P. Kempf.

The issue is rounded off by two non-technical articles. We are presented with *Gunther Schmidt?s life as a mathematician and computer scientist* by R. Berghammer and M. Winter, while M. Müller and B. Möller write, with tongue in cheek *on nothing* — something one often feels is the result of all efforts anyway.

We are most grateful to Jan Bergstra and John Tucker, the parting, and Rocco Nicola, the new, editors-in-chief of JLAP for hosting this fine special issue, which continues a series that was originated by Jan and John in 2006 and has successfully reflected the progress of the RAMiCS conferences. Next we want to thank the authors for their interesting and profound contributions, and the referees for their careful and

constructively critical evaluation of the submissions. Finally we gratefully acknowledge the help of Georg Struth in administering the reviews of the papers co-authored by any of the editors to warrant independence, and the always efficient and pleasant collaboration of Inge Bethke on the technicalities of the issue.

Finally, want to deeply thank Gunther Schmidt for all his profound and stimulating contributions to the theory and applications of relations and algebraic structures in general. We will most cordially congratulate him at his 75th birthday which will take place on ... — following a widespread superstition we refrain from doing so now. We hope that he will spend many more lively and fruitful years in good health and be as creative and prolific as ever!

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