5th International Seminar on Relational Methods in Computer Science

5e Séminaire international sur les méthodes relationnelles en informatique

January 9–14, 2000 / 9–14 janvier 2000
Valcartier, Québec, Canada

Sponsoring Institutions / Institutions commanditaires
Centre de recherches mathématiques de l'Université de Montréal (CRM)
Département d'informatique de l'Université Laval

Organizers / Organisateurs
Jules Desharnais, Université Laval, Canada
Marc Frappier, Université de Sherbrooke, Canada
Wendy MacCaull, St.Francis Xavier University, Canada

Program

Monday, January 10

7:30 to 9:00 Breakfast.

9:00 Jules Desharnais: Opening and various information.

Session chair: Wendy MacCaull. Do generators induce pregnancy?

9:10 Jacques Riguet. Generating and extending relational algebra by relational generators.

9:55 Gunther Schmidt. Partialities and pregnant relation algebras.

10:40 Break

Session chair: Wendy MacCaull. Fuzziness

11:00 Yasuo Kawahara and Hitoshi Furusawa. Crispness in Dedekind categories.

11:45 Michael Winter. An algebraic formalisation of L-fuzzy relations.

12:30 Lunch

Session chair: Marc Frappier. Closure

14:30 Robert E. Jamison and John L. Pfaltz. Closure systems and their structure.

15:15 Robert E. Jamison and Beth Novick. On a contraction-expansion closure in graphs.

16:00 Break

Session chair: Marc Frappier. Complex algebras

16:30 Peter Jipsen. Some results about complex algebras of algebras.

18:30 Dinner

Tuesday, January 11

7:30 to 9:00 Breakfast.

Session chair: Rudolf Berghammer. Past, future, and logic

9:00 Invited talk: Gunther Schmidt. A retrospective view on RelMiCS and some promising directions.

9:45 L. Gordeev. Combinatorial principles relevant to finite variable logic.

10:30 Break

Session chair: Rudolf Berghammer. Part of

11:00 Ryszard Janicki and Ridha Khedri. Remarks on mereology of relations.

11:45 Ivo Düntsch, Ewa Orłowska, and Hui Wang.
An algebraic and logical approach to the approximation of regions.

12:30 Lunch

Session chair: Ewa Orłowska. Type theory and Hoare logic

14:30 Carlos Gonzalía. The allegory of E-relations in constructive type theory.

15:15 Dexter Kozen and Jerzy Tiuryn. On the completeness of propositional Hoare logic.

16:00 Break

Session chair: Ewa Orłowska. Graphs

16:30 J. Cortadella and G. Valiente. A relational view of subgraph isomorphism.

18:30 Dinner

Wednesday, January 12

7:30 to 9:00 Breakfast.

Session chair: Yasuo Kawahara. Fuzzy demons

9:00 Ali Jaoua, Faisal Alvi, Samir Elloumi and Sadok Ben Yahia. Galois connection in fuzzy binary relations, applications for discovering association rules and decision making.

9:45 Wolfram Kahl. Unsharp demonic products and stratified term graphs.

10:30 Break

Session chair: Yasuo Kawahara. Kleene

11:00 Jules Desharnais and Bernhard Möller. Characterizing functions in Kleene algebras.

11:45 Jules Desharnais and Bernhard Möller. Kleene deals with demons.

12:30 Lunch

13:30 Afternoon at Village des sports (ice slides, snow rafting)

18:30 Dinner (at Auberge du Mont)

Thursday, January 13

7:30 to 9:00 Breakfast.

Session chair: Michael Winter. Databases

9:00 Yasuo Kawahara and Hitomi Ohkuma. Relational aspects of relational database dependencies.

9:45 Yoshihiro Mizoguchi and Pericles Loucopoulos. Formalizing the definition and evolution of models in a repository using the relational graph expressions.

10:30 Break

Session chair: Michael Winter. Specification and design

11:00 Rudolf Berghammer and Thorsten Hoffmann. Relational depth-first-search with applications.

11:45 Marcelo F. Frias, Gabriel A. Baum and Esteban de la Canal. How to say Greedy in fork algebras.

12:30 Lunch

Session chair: Jules Desharnais. Security

14:30 Invited talk: Dexter Kozen. Certification of compiler optimizations using Kleene algebra with tests.

15:15 Invited talk: Mourad Debbabi. Security by typing.

16:00 Break

Session chair: Jules Desharnais. Demo and discussion

16:30 Dexter Kozen. Demonstration of software (14:30 talk continued).

16:45 Gunther Schmidt, leader of the discussion: discussion on the future of RelMiCS, next RelMiCS, information about submission of papers for Information Sciences, JoRMiCS, etc.

18:00 Tour and dinner in Québec

Friday, January 14

7:30 to 9:00 Breakfast.

Session chair: Marcelo F. Frias. Refined demo

9:00 Rudolf Berghammer. Demonstration of the system RELVIEW.

9:45 Marc Frappier. Proving the refinement of a black box by a state box in Cleanroom.

10:30 Break

Session chair: Marcelo F. Frias. Distances

11:00 Habib Ammari and Ali Mili. Lattice based distances.

12:30 Lunch

Abstracts of invited talks

Mourad Debbabi, Université Laval
Security by Typing

We present in this talk a type-based characterization of cryptoprotocol instrumentation by an active, malicious and smart intruder. The type system captures all the message computations that might be done by such an intruder. Types are communication steps. Static environments are protocol specifications. Actually, protocol specifications are maps that take message sets to types. These specifications are automatically extracted from conventional cryptoprotocol notation. We present the typing rules and establish their correctness with respect to the protocol specification and intruder abilities. We propose an inference algorithm that mechanizes the type system. That algorithm is proven to be sound with respect to the typing rules. Furthermore, we discuss in detail the verification issues of security properties such as authentication and secrecy. The verification of these properties is now reduced to a typing problem in our type system.

Dexter Kozen, Cornell University
Certification of Compiler Optimizations using Kleene Algebra with Tests

Kleene algebra with tests (KAT) can be used to verify a wide assortment of common compiler optimizations, including dead code elimination, common subexpression elimination, copy propagation, loop hoisting, induction variable elimination, instruction scheduling, algebraic simplification, loop unrolling, elimination of redundant instructions, array bounds check elimination, and introduction of sentinels. In each of these cases, it is possible to give a formal equational proof of the correctness of the optimizing transformation. In this talk I will give several examples. In addition, I will discuss an interesting (and somewhat baffling) paradox that arises with the use of the assertion "i is a dead variable".

Gunther Schmidt, Universität der Bundeswehr München
A retrospective view on RelMiCS and some promising directions

The developments that led to the RelMiCS initiative are briefly recalled. Some remarks on the history of six years are dropped. The question is raised and discussed to which extent we have been successful according to our initial goals.

Then an attempt is made to propose some directions in which we might choose to go in the future with regard to new and exciting topics as well as to organizational matters. How can relational methods be brought to a broader audience, e.g. via tutorial events in connection with important more general conferences, via an additional effort for a broadly accepted notation, via further relational simulation tools, by cooperative work for textbooks aiming at undergraduate courses, etc.