
XIII Simposio Latinoamericano de Lógica Matemática



Oaxaca, México; August 2006

Contents

Introduction	v
1 General Information	1
1.1 Committees	1
1.2 Plenary Speakers	2
1.3 Sponsors	2
1.4 Escuela Latinoamericana de Lógica Matemática	3
1.5 Program Overview	4
2 General advise and information about Oaxaca	7
2.1 How to get to Oaxaca	7
2.2 Getting Around	9
2.3 General Information	9
2.3.1 Weather	9
2.3.2 Health	9
2.3.3 Money and Exchange	10
2.3.4 Telephones	10
2.3.5 Electricity	10
2.3.6 Tipping	10
2.3.7 Security Precautions	10
2.4 The City and its Sights	11
2.5 Food and Restaurants	13
3 Program	17
3.1 Program and Abstracts for the Plenary Lectures	17
3.2 Program for the Parallel Sessions	23
3.2.1 Non-classical Logics (NCL)	23
3.2.2 Algebraic Logic (AL)	24
3.2.3 Logic in Computer Science and Artificial Intelligence (LCSAI)	25
3.2.4 Model Theory (MT)	26
3.2.5 Topology (TOP)	26
3.2.6 Set Theory (ST)	27
3.2.7 Proof Theory (PT)	27
3.2.8 Philosophical Logic and Foundations (PLF)	27
3.2.9 General Topics (GT)	28
3.2.10 Spontaneous Talks (SPO)	28

Algebraic Logic 4

Chair: Nido

1. Gomes C. , Sarmiento L. , M. Videla M., A note on free ternary algebras over a poset.
2. Pascual I., Principal Congruences in θ -valued Lukasiewicz-Moisil Algebras.

Algebraic Logic 5

Chair: Nido

1. Figallo A. A class of algebraic models for monadic $(n+1)$ -valued Lukasiewicz propositional calculus
2. Cimadamore C. Topological representation for monadic implication algebras.

Algebraic Logic 6

Chair: Nido

1. Lewin R., Pigozzi D. Remarks about the logic of Abelian lattice ordered groups.
2. Figallo A., Sanza C. A Topological duality for monadic $(n \times m)$ -valued Lukasiewicz algebras with negation.

Algebraic Logic 7

Chair: Mendoza

1. Zander M. A., Descomponibilidad del álgebra de Hilbert libre

3.2.3 Logic in Computer Science and Artificial Intelligence (LCSAI)

Three sessions on Monday and Tuesday.

Logic in Computer Science and Artificial Intelligence 1

Chair: Miranda

1. Dionisio F., Gouveia P., Marcos J. Teaching and experimenting with deductive systems using a generic proof assistant.
2. Pimentel E, Miller D., On the specification of sequent systems.

Session A

Time	Monday NCL	Tuesday NCL	Wednesday NCL	Thursday NCL	Friday ST
10:15 - 11:45		Olmedo/Estrada Freund	Pazos Celani/Cabrer	Chávez/Oziewicz Chávez/Oziewicz	Cárdenas Schwarze/Marshall
16:00 - 17:30	Paiva/Souza Gaytán	Beziau Ertola/Sagastume		Zander (AL)	Fidel/Figallo

Session B

Time	Monday LCSAI	Tuesday LCSAI	Wednesday AL	Thursday AL	Friday AL
10:15 - 11:45		Diaz/Uzcategui Pino	Ziliani Oliva	Figallo/Ramón/Saad Caicedo	Figallo Cimadamore
16:00 - 17:30	Dionisio/Gouveia/Marcos Pimentel/Miller	Arrazola/Osorio Paiva/dal Pian		Gomes/Sarmiento/Videla Pascual	Lewin/Pigozzi Figallo/Sanza

Teaching and experimenting with deductive systems using a generic proof assistant

F. Miguel Dionisio, Paula Gouveia

Center for Logic and Computation, Department of Mathematics,
Instituto Superior Técnico, Av. Rovisco Pais 1049-001 Lisboa, Portugal
fmd@math.ist.utl.pt, mpg@math.ist.utl.pt

Joao Marcos

Department of Informatics and Applied Mathematics, CCET / UFRN, BR
Center for Logic and Computation, Department of Mathematics,
Instituto Superior Técnico, Av. Rovisco Pais 1049-001 Lisboa, Portugal
jmarcos@math.ist.utl.pt

There is nowadays a sizable number of systems that implement ‘mathematics in the computer’. Among such systems, tactic provers are those tools that allow users both to write interactive or semi-automated computer-assisted proofs and to heuristically explore theorem-proving tactics with a very high level of confidence. Some generic proof assistants provide in fact an environment that is flexible enough so as to allow many different logics to be implemented as theories. Such is the case of *Isabelle*, a software that allows for the definition and use of deductive systems for many logics, presentable in many different formats: natural deduction rules, Hilbert-style axioms and rules, sequent-style rules, tableau rules, and so on. *Isabelle* brings a good amount of built-in logic machinery. The logical framework it provides is based on a constructive higher-order logic with three main components: (i) a meta-implication that may be used in implementing the rules of the specific object-logic being thereby represented and that takes care of the discharge of assumptions; (ii) a meta-universal quantification that may be used in implementing a number of object-logic quantifiers; (iii) a meta-equality that may be used in implementing abbreviations as rewrite rules. In more detail, we are talking about a mechanizable theorem-prover in which: (i) object-logic formulas are precise simply-typed λ -terms disambiguated by way of a priority grammar; (ii) rules of the object-logic are represented not as functions but as formulas of the underlying higher-order logic; (iii) the combination and application of those rules is performed by way of a uniform method of inference, namely higher-order resolution used in syntactic equation solving; (iv) tactics are implemented independently of the object-logic being represented. The flexibility of *Isabelle* is augmented by the possibility of defining new tacticals as combinations of tactics that allow for the implementation of automated deduction. For such, the general purpose functional programming language *ML*, used in the proof assistant’s implementation, comes to help.

Such highly flexible models of logic software have a strong potentiality still largely to be unleashed in their use in computer-based learning and their integration to the standard set of teaching strategies and resources. Used as laboratories for experimentation with abstract entities, the right software can turn a computer into a sort

of ‘bubble chamber’ where ideas can be tested and improved —or rejected. In addition, computers can also help one in ‘creating intuition’ about certain subjects. This outlook converts the computer into a genuine tool for doing philosophical and mathematical research.

This presentation reports on the authors’ experiences in teaching Computational Logic using the Isabelle proof assistant with the main purpose of encouraging experimentation with classical and non-classical logics.