FACULTY OF ECONOMICS, NIŠ
FACULTY OF PHILOSOPHY, NIŠ
MATHEMATICAL INSTITUTE SANU, BEOGRAD

International Conference on

ALGEBRA
LOGIC &
DISCRETE MATHEMATICS

PROGRAMME

NIŠ, APRIL 14–16, 1995

Friday, April 14

10^{00}–10^{20} OPENING CEREMONY

Chairman: S. Bogdanović

10^{20}–11^{00} **D. Cvetković and S. Simić**
Graphs with small second largest eigenvalue

11^{00}–11^{05} Break

Chairman: Ž. Mijajlović

11^{05}–11^{45} **A. Dragalin** Albert Dragalin, Debrecen, Hungary
Explicit algebraic models for constructive and classical theories with non-standard elements

11^{45}–12^{00} **R. Dacic** Rade Dacić
O projektu iz istorije matematike

11^{45}–13^{00} COCKTAIL PARTY

13^{00}–16^{00} LUNCH BREAK

Chairman: Z. Marković

16^{00}–16^{40} **C. Dimitracopoulos**
Subsystems of Peano Arithmetic and classical results of Number Theory

16^{40}–16^{50} Coffee break

16^{50}–19^{00} LECTURES IN THREE SECTIONS

Section: Algebra

Chairman: M. Žizović

16^{50}–17^{05} **C. Groza**
Semigroups of integral functions in valued fields

17^{05}–17^{20} **V. Perić**
On commutativity in rings

17^{20}–17^{35} **S. Milić and S. Tepavčević**
On associative law on fuzzy correspondences

17^{35}–17^{50} **A. T. Lipkovski**
An old family of algebraic curves is rational

17^{50}–18^{05} **A. Krapež**
Generalized associativity – a solution by computer

18^{05}–18^{15} Coffee break

Chairman: **M. Ćirić**

18^{15}–18^{30} **M. Žižović**

18^{30}–18^{45} **P. Stanimirović and M. Stanković**
Determinantal representation of generalized inverses over integral domains

18^{45}–19^{00} **G. Čupona and S. Markovski**
Varieties of algebras defined by systems of primitive identities

19^{00}–19^{15} **B. Šešelja**
Algebras with UCEP

Section: Logic

Chairman: **M. Rašković**

16^{50}–17^{20} **Z. Marković**
Omitting types in Kripke models

17^{20}–17^{40} **I. D. Aranđelović**
Remark on some results of M. Zorn, N. Bourbaki and M. Tasković

17^{40}–18^{00} **D. A. Romano**
Dekompozicija relacije koekvivalencije na Dekartovom proizvodu skupova sa relacijama različitosti

18^{00}–18^{10} Coffee break

Chairman: **P. Tanović**

18^{10}–18^{40} **M. D. Rašković**
When is the maeasurability of a function sufficient for its continuity

18^{40}–19^{00} **S. Ghilezan**
Topologies in Lambda Calculus

Section: Discrete Mathematics

Chairman: **R. Stanković**

16^{50}–17^{20} **R. Živaljević**
Combinatorial geometry on vector bundles

17^{20}–17^{40} **D. M. Acketa and V. Mudrinski**
On some 4- and 5-designs on ≤ 49 points

Friday, April 14

17^{40}–18^{00} **K. Iordjev**
Inclusion of some classes of formal languages in group languages

18^{00}–18^{10} Coffee break

Chairman: R. Živaljević

18^{10}–18^{40} **Lj. M. Kocić**
Discrete methods of visualizing fractal sets

18^{40}–19^{00} **A. Mandak**
On weight ad block designs

Chairman: Ž. Perović

9^{00}– 9^{40} **S. Crvenković**
Word problems for varieties of algebras

9^{40}– 9^{45} Break

Chairman: S. Crvenković

9^{45}–10^{25} **M. Ćirić and S. Bogdanović**
Theory of greatest decompositions of semigroups

10^{25}–10^{35} Coffee break

10^{35}–13^{00} LECTURES IN THREE SECTIONS

Section: Algebra

Chairman: Z. Stojaković

10^{35}–11^{00} **I. Koryakov**
Pseudovarieties generated by divisors of two-generated semigroups

11^{00}–11^{15} **B. Janeva**
Congruences on vector valued groups

11^{15}–11^{30} **S. Lakić**
Iracionalni polinomi

11^{30}–11^{45} **Lj. D. Kočinac**
Some classes of topological semigroups

11^{45}–11^{55} Coffee break

Chairman: B. Stamenković

11^{55}–12^{15} **Z. Stojaković**
Reducibility of n-quasigroups

12^{15}–12^{30} **M. Bjelica**
Fixed point method and Hadamard's inequality

12^{30}–12^{45} **Ž. Mitrović**
O jednoj kongruenciji u globalnoj polugrupi

12^{45}–13^{00} **B. V. Novikov**
On modification of the Galois group

Section: Logic

Chairman: A. Kron

10^{35}–11^{05} **Ž. Mijajlović**
Expansions of countable models

11^{05}–11^{25} **M. Grulović and M. Kurilić**
Notes on reduced ideal-products

11^{25}–11^{45} **D. Anđelković**
Embedding of Aristotle's syllogistics into contractionless logic

11^{45}–11^{55} Coffee break

Chairman: M. Grulović

11^{55}–12^{25} **A. Kron**
Identity and permutation

12^{25}–12^{45} **M. Borisavljević**
Jedna veza eliminacije sečenja i normalizacije

12^{45}–13^{05} **A. Jovanović and Ž. Mijajlović**
Automatic proving theorems in field theory by use of elimination of quantifiers

Section: Discrete Mathematics

Chairman: Lj. Kocić

10^{35}–11^{05} **S. V. Jablan**
Simple and multiple antisymmetry

11^{05}–11^{25} **M. Racković i D. Surla**
Strukture podataka i algoritmi za formiranje simboličkih modela robotskih sistema

11^{25}–11^{45} **I. Jovanović**
On coefficient multipliers from H^p into H^q

11^{45}–11^{55} Coffee break

Chairman: S. Jablan

11^{55}–12^{25} **I. Milovanović, E. Milovanović, M. Mihajlović and M. Stojčev**
A set of axioms for evaluating multiprocessors performances

12^{25}–12^{45} **S. Kecman**
Analysis of structural matching in automated fingerprint recognition based on data compression

12^{45}–13^{05} **S. Matić-Kekić and D. M. Acketa**
A classification of loops on at most six elements

Saturday, April 15

13^{00}–15^{00} LUNCH BREAK

15^{00}–19^{00} EXCURSION

20^{00}– DINNER IN HOTEL "CENTROTURIST"

Chairman: G. Milovanović

9^{00}– 9^{40} **A. Ivić**
On the maximal order of certain arithmetic functions

9^{40}– 9^{45} Cigaret break

Chairman: V. Rakočević

9^{45}–10^{25} **G. V. Milovanović**
Some nonstandard types of orthogonality and applications

10^{25}–10^{35} Coffee break

10^{35}–13^{00} LECTURES IN THREE SECTIONS

Section: Algebra

Chairman: B. Šešelja

10^{35}–10^{50} **V. Rakočević**
Harte's theorem for regular boundary elements

10^{50}–11^{05} **M. Živković**
Primitive polinomials

11^{05}–11^{20} **Z. Rakić**
Polinomijalne deformacije omotačke algebre $U(sl(2,c))$ i njene reprezentacije

11^{20}–11^{35} **M. Ploščica**
Affine complete distributive lattices and related problems

11^{35}–11^{50} **Z. Šunić**
One generalization of the notion of universal algebra

11^{50}–12^{00} Coffee break

Chairman: A. Tepačević

12^{00}–12^{15} **M. Ćirić, S. Bogdanović and T. Petković**
A generalization of direct limits of algebras

12^{15}–12^{30} **M. Božinović and P. V. Protić**
Congruences on an AG^{**}-groupoids

12^{30}–12^{45} **N. Stevanović and P. V. Protić**
Inflations and orthogonal sums of Abel-Grassmann's groupoids

12^{45}–13^{00} **Ž. Mitrović i I. Berković**
Indukovane relacije na partitivnom skupu

Section: Logic

Chairman: R. Đorđević

10^{35}–11^{05} **Ž. Perović**
Partial completions of lattices

11^{05}–11^{25} **I. Berković**
Uređena linearna rezolucija kao osnova za razvoj i primene sistema za automatsko dokazivanje teorema

11^{25}–11^{45} **P. Janičić and S. Kordić**
EUCLID – the geometry theorems prover

11^{45}–11^{55} Coffee break

Chairman: D. Romano

11^{55}–12^{25} **P. Tanović**
Ommiting types in countable superstable theories

12^{25}–12^{45} **P. Hotomski**
Trideset godina metode rezolucije

12^{45}–13^{05} **Ž. Mijajlović and D. Ćirić**
Dimension of class spaces

Section: Discrete Mathematics

Chairman: D. Acketa

10^{35}–11^{05} **R. Tošić**
Pursuit–evasion problems on grids

11^{05}–11^{25} **Ž. Popeska and K. Trenevska**
Operations with block designs

11^{25}–11^{45} **M. Stanković and B. Todorović**
Terminal chaos in discrete systems: a tool for hierarchical interconnecting of neural networks

11^{45}–11^{55} Coffee break

Chairman: R. Tošić

11^{55}–12^{25} **R. S. Stanković and M. Stanković**
Calculation of the Gibbs derivatives on finite abelian groups trough the decision diagrams

12^{25}–12^{45} **S. Rakovac**
Total complex disjunctive decomposition of switching functions

12^{45}–13^{05}

Sunday, April 16

13^{00}–16^{00} LUNCH BREAK

Chairman: S. Simić

16^{00}–16^{40} **M. S. Petković**
Iterative methods for bounding the inverse of a matrix

16^{40}–16^{50} Coffee break

16^{50}–19^{00} LECTURES IN THREE SECTIONS

Section: Algebra

Chairman: A. Lipkovski

16^{50}–17^{05} **L. N. Đorđević, Đ. R. Đorđević and Z. A. Ilić**
A remark on convolution polynomials

17^{05}–17^{20} **Z. D. Đorđević**
On embedding of one class of semigroups into relation algebras

17^{20}–17^{35} **P. V. Protić**
Bands of nil-extensions of right simple semigroups

17^{35}–17^{50} **S. Bogdanović, M. Ćirić and M. Mitrović**
Semigroups whose subsemigroups are semilattices of Archimedean semigroups

17^{50}–18^{05} **Lj. Spalević**

18^{05}–18^{15} Coffee break

Chairman: P. Protić

18^{15}–18^{30} **D. Đorđević**
Fredholm Theory and some generalizations

18^{30}–18^{45} **V. Vuković**
On distributors of (nonassociative) near–rings

18^{45}–19^{00} **N. Stojković**
Semi-Fredholm elements in Banach Algebra

19^{00}–19^{15} **B. Stamenković**
Semidirect products of some semigroups

Section: Logic

Chairman: Đ Vukomanović

16^{50}–17^{20} **R. Đorđević**
Topological class models

17^{20}–17^{40} **D. A. Romano**
Neke kompatibilne substrukture grupe homomorfizama

17^{40}–18^{00} **B. Malešević**
One elementary proof of the Wright's theorem and an example of the unbounded linear functional

18^{00}–18^{10} Coffee break

Chairman: **S. Gilezan**

18^{10}–18^{30} **J. Stojanović**
Hyperreal fields

18^{30}–18^{50}

18^{50}–19^{10}

Section: Discrete Mathematics

Chairman: **M. Stanković**

16^{50}–17^{20} **V. B. Kudryavcev**
Expressability and completeness in algebras of automaton mappings

17^{20}–17^{40} **V. B. Kudryavcev, Š. Uščumlić and G. Kilbarda**
Automata and labyrinths

17^{40}–18^{00} **G. Kilibarda and Š. Uščumlić**
On the problem of synthesis for collectives of automata in labyrinths

18^{00}–18^{10} Coffee break

Chairman: **I. Milovanović**

18^{10}–18^{30}

18^{30}–18^{50}

18^{50}–19^{10}

Conference on

Algebra, Logic and Discrete Mathematics

Niš, April 14–16, 1995.

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EXPANSIONS OF COUNTABLE MODELS

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ABSTRACT

Works of Kueker, Reyes, Barwise, Makkai and others, show that certain sets of model-theoretic objects related to a countable model $\mathbf{A}$, as Aut$\mathbf{A}$ for example, behave as analytic subsets of the Cantor discontinuum. Based on the properties of Lindenbaum algebras we show that the set all of all countable expansions of a countable model $\mathbf{A}$ to a Σ^1_1 theory T of $L_{\omega_1\omega}$ has the same property. For example, the following is proved for a class of second order sentences:

Theorem *Let* $\mathbf{A}$ *be a countable model of a countable first-order language* L*, and let* L' *be a countable first-order expansion of* L*. If* φ *is an infinitary* Σ^1_1 *sentence in* L' *of the form* $\exists P_1 \exists P_2 \ldots \psi(P_1, P_2, \ldots)$*, where* $\psi(P_1, P_2, \ldots)$ *is an* $L''_{\omega_1\omega}$ *sentence, where* $L'' = L' \cup \{P_i \mid i \in \omega\}$*,* P_i*,* $i \in \omega$ *are new predicate symbols, then the number of expansions of the model* $\mathbf{A}$ *to* L' *that are models of* φ *satisfies* CH*, i.e. this number is either* $\leq \aleph_0$*, or it is equal to* $2^{\aleph_0}$*.*

The proof of this theorem is based on the properties of analytic subsets of the Cantor space, and a variant of Suslin operation.

As an example we obtain Kueker's Theorem: If $\mathbf{A}$ is a countable model of a countable language L, then Aut$\mathbf{A}$ satisfies CH. To see this let $L(F) = L \cup \{F\}$, where F is a unary function symbol, and T be a theory of $L(F)$ which states that F is an automorphism in respect to symbols of L. Then obviously there is one-to-one correspondence between expansions of $\mathbf{A}$ to $L(F)$ that are models of T, and automorphisms of $\mathbf{A}$. Therefore, $|\text{Aut}\mathbf{A}|$, according to the stated theorem, satisfies CH.

In a similar way as in the preceding example, one can show that the set of all prime ideals of a countable commutative ring also satisfies CH. In other words, the Zariski space of a countable commutative ring satisfies CH.

As the last example, it is easily deduced from the above theorem by designing an appropriate sentence φ, Kueker-Reyes Theorem:

If $\mathbf{A}$ *is a countable model in a countable language* L *and* $P \subset A$*, then the set* $\{Q \subset A \mid (\mathbf{A}, Q) \cong (\mathbf{A}, P)\}$ *satisfies* CH.

The above technique can be used in other situations, too. For example, I. Farah gave a new and short proof of the Morley theorem on the number of countable models, based on the Silver's result on the number of classes of an analytic equivalence relation.