Brief account of several conferences on algebra

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Alexander Shostak’s Workshop

Department of Mathematics, University of Latvia
Riga, Latvia
March 24, 2011
Outline

1. 32nd Linz Seminar on Fuzzy Set Theory
2. 81st Workshop on General Algebra
3. Applications of Algebra XV
4. Workshop “Algebra and its applications” (call for participation)
32nd Linz Seminar on Fuzzy Set Theory

Conference information

Title  32nd Linz Seminar on Fuzzy Set Theory
Subtitle  Decision Theory: Qualitative and Quantitative Approaches
Venue  Sankt Magdalena - das Bildungshaus, Linz, Austria
Time  February 1 - 5, 2011
Organizer  Johannes Kepler Universität Linz, Linz, Austria
Goal  The goal of the conference is to present and to discuss recent advances in the theory of decision procedures and to concentrate on its applications in various areas.
Web page  http://www.flll.jku.at/div/research/linz2011
Abstracts and proceedings

Abstracts  Extended abstracts (1 to 4 pages) are published as a book of abstracts before the conference. The contributions are selected based upon their quality as evaluated by the reviewers.

Proceedings  Conference proceedings are generally published as a special issue of “Fuzzy Sets and Systems” (this year) or a book.
Since their inception in 1979, the Linz Seminars on Fuzzy Sets have emphasized the development of mathematical aspects of fuzzy sets, bringing together researchers in fuzzy sets and well-established mathematicians, whose work outside the fuzzy field can provide direction for further research.

The philosophy of the conference has always been to keep it small and intimate, in order that informal critical discussions remain central.
Key features of the conference

- The number of participants of the seminar is usually bounded above by 40 with broad international representation and a mix of pure and applied interests.
- There are no parallel sessions so that all participants focus on each presentation and fully engage in each topic.
- There is ample time for discussion of each presentation, with followup round tables for discussion of open problems as well as issues raised in the talks.
Cost and accommodation

Cost  The seminar fee is EUR 550 and covers room, board (except the evening meals), abstract volume, and the social program.

Accommodation  The conference (including accommodation of the participants) takes place on a hill, overlooking Linz, at the Sankt Magdalena Bildungshaus. Room and board are covered by the conference fee. Dinners are to be arranged individually. The room is automatically reserved by the local organizers on receipt of your payment (no individual hotel reservation is necessary).
Topics and program of the 32nd Linz Seminar

Topics

- Decision theory
  - Multifactorial evaluation and aggregation operations
  - Utility theory
  - Cooperative game theory
  - Preference structures
  - Modelling of preferential independencies
  - Revision of preferences

  and applications to
  - Multicriteria decision support
  - Decision under uncertainty
  - Voting procedures
  - Recommender Systems
  - Electronic commerce

Program

Conference program
Call for participation in the next seminar

Title 33rd Linz Seminar on Fuzzy Set Theory
Subtitle Enriched Categories and Lattice-Valued Structures
Venue Sankt Magdalena - das Bildungshaus, Linz, Austria
Time February 14 - 18, 2012
Organizer Johannes Kepler Universität Linz, Linz, Austria
Chairpersons Ulrich Höhle and Lawrence N. Stout

You are cordially invited to participate.
Title in German  81. Arbeitstagung Allgemeine Algebra (AAA 81)
Title in English  81st Workshop on General Algebra
Venue  University of Salzburg, Salzburg, Austria
Time  February 3 - 6, 2011
Organizer  Institute of Mathematics of the University of Salzburg, Salzburg, Austria
Goal  The AAA is a workshop in the field of general algebra, taking place twice a year, usually at universities in Germany and Austria, now also in other countries of the European Union. The meetings are organized by local colleagues.
Web page  http://dmg.tuwien.ac.at/aaa81/index.html
Abstracts  Short abstracts (up to 1 page) are sometimes published as a book of abstracts before the conference.

Proceedings  Conference proceedings are sometimes published as a special issue of
- “Contributions to General Algebra” (this year)
- “Discussiones Mathematicae - General Algebra and Applications”
- “Demonstratio Mathematica”

depending on the location of the conference.
Conference history: AAA

The traditional AAA was founded in 1970 by Rudolf Wille from Darmstadt. Since then, twice a year researchers meet in order to exchange their views and results in algebra and its related topics. The leading of the conference stayed with Rudolf Wille till 1995, when after 50 conferences he passed it to Reinhard Pöschel and Bernhard Ganter from Dresden.
Conference history: CYA

There was a wish to merge the AAA conference series with similar activities in East Germany such as

- “Arbeitstagung Algebra und Grenzgebiete”
  (organized by Hans-Jürgen Hoehnke)
- “Tagung Junger Algebraiker”
  (Conference of Young Algebraists (CYA))

the latter held at Potsdam University (lead by Klaus Denecke). The important emphasis of the conference is that young researchers, in particular undergraduate and graduate students, are encouraged to participate and to contribute. Broader introduction into the areas of interest is given by experienced researchers. The first conference of the united series took place in February 1996 in Potsdam.

Web page AAA/CYA conferences web page

http://tu-dresden.de/die_tu_dresden/fakultaeten/fakultaet_mathematik_und_naturwissenschaften/fachrichtung_mathematik/institute/algebra/aaaseries
Cost, accommodation and venue

**Cost**  The conference fee is EUR 50 and includes the conference documents, the coffee breaks and the conference dinner.

**Accommodation**  Participants of the seminar are asked to provide for their accommodation themselves.

**Venue**  Department of Mathematics of the University of Salzburg, Salzburg, Austria
Topics, participants and program of the 81st Workshop

Topics

- Universal algebra and lattice theory
- Classical algebra
- Applications of algebra
- Algebraic aspects of mathematical logic

Participants Participants of the conference

Program Conference program

Abstracts Conference abstracts
Call for participation in the next workshop

Title  International Conference on Semigroups, General Algebra, and Applications
Subtitle  82th Workshop on General Algebra (AAA 82) / 26th Conference for Young Algebraists (CYA 26)
Venue  Institute of Mathematics of the University of Potsdam, Potsdam, Germany
Time  June 24 - 26, 2011
Organizer  Institute of Mathematics of the University of Potsdam, Potsdam, Germany
Chairpersons  Klaus Denecke and Jörg Koppitz
Web page  http://users.math.uni-potsdam.de/~denecke/First Announcement.htm

You are cordially invited to participate.
Title Applications of Algebra XV

Venue Hotel “Fian”, Zakopane, Poland

Time March 7 - 13, 2011

Organizer Institute of Mathematics and Computer Science of Jan Długosz University, Częstochowa, Poland

Idea The main idea of the event is to put together researchers in different topics, which involve algebra, to promote interaction and cooperation. The intention is to gather people who apply algebra in one way or another, i.e., pure algebraists, other mathematicians, computer scientists, logicians, linguists, etc.

Abstracts and proceedings

Abstracts  Extended abstracts (no limit is given) are published as a book of abstracts before the conference.

Proceedings  Conference proceedings are sometimes published as a special issue of “Bulletin of the Section of Logic” (last year).
Conference history

- The first conference entitled “Applications of Algebra in Logic and Computer Science” and held in Zakopane, May 1997 was thought as a local event for scientists from south of Poland.

- The conference would have not been possible without support of many people from different universities. Due to them it was possible to organize the conference year by year. Succeeding conferences had growing number of participants from different scientific centers. The lectures given covered various domains, including not only logic and computer science, but also functional equations, graph theory, linguistics and, strikingly, even economy and sociology.

- Following the successful developments, since 2000, the event is advertised simply as “Applications of Algebra”.
Cost, accommodation and venue

**Cost**  The conference fee is PLN 280 (approximately EUR 70) and PLN 170 for an accompanying person.

**Accommodation**  For participants of the conference the reduction of costs of accommodation at the hotel “Fian” is provided. The price for accommodation (all meals included) is about PLN 800 (a bed in a double room) or PLN 950 (single room). Conference participants are requested to contact the hotel individually.

**Venue**  The conference takes place at hotel "Fian" in Zakopane, Poland. It is a quiet hotel situated in a nice scenery. Zakopane, which is about 100 km south of Krakow and can be reached from there by bus or train, is regarded as the winter capital of Poland. This time of year, there are usually good skiing opportunities.
Program of the XVth conference and some photos

**Program** Participants and conference program

**Photos** Photos from the past events
Title  Workshop “Algebra and its applications”
Venue  Svente Manor hotel, Svente, Latvia
Time  April 29 - May 1, 2011
Organizer  Daugavpils University, Daugavpils, Latvia
Aim  The aim of the workshop is to report and discuss significant recent research related to algebra and its various applications.
Web page  http://www.de.dau.lv/aa2011
Abstracts and proceedings

Abstracts  The abstracts (up to 1 page) will be published in the workshop collection of abstracts, available to participants.

Proceedings  Selected papers of the conference may be published in the workshop proceedings by Daugavpils University. They all will be peer-reviewed.
Conference history and main features

- This annual spring workshop has been initiated by Estonian algebraists several years ago.
- Traditionally, it has attracted mathematicians, interested in various areas of algebra: category theory, universal algebra, semigroup and group theory, lattice theory, linear algebra.
- The working language of the workshop is English.
Cost and accommodation

**Cost**  There is no conference fee.

**Accommodation**  Participants of the seminar are supposed to stay at Svente Manor hotel. The hotel offers shared 2 person rooms. The price for one person is approximately EUR 30 per night and includes breakfast. Participants pay for the meals individually or ask the cost to be added to the hotel bill.

**Venue**  Svente Manor accommodates both a museum of military vehicles and a hotel. The museum is located in the restored farmhouse of the counts Plater-Siebergs in the Jaunsvente Manor and the hotel is situated in the former manor castle. Each hotel room bears the name of a different month of the year.
Topics and list of participants of the workshop

Topics

- Order, lattices, ordered algebraic structures
- General algebraic systems
- Combinatorics
- Number theory
- Algebraic geometry
- Linear algebra
- Rings and algebras
- Category theory
- Theory of groups, semigroups and their generalizations
- Algebraic theory of automata and languages
- Applications of the above

Participants Current list of participants
Thank you for your attention!
**Tuesday, February 1, 2011**

09:00–09:15 am  Opening

09:15–10:15 am  S. GRECO:  *Generalizing again the Choquet integral: the profile dependent Choquet integral*

10:15–10:45 am  D. DUBOIS:  *Lexicographic refinements of fuzzy measures, Sugeno integrals and qualitative bipolar decision criteria*

10:45 am Coffee break

11:15–11:45 am  M. COUCEIRO, J.-L. MARICHAL:  *On three properties of the discrete Choquet integral*

11:45–12:15 pm  U. FAIGLE, M. GRABISCH:  *A discrete Choquet integral for ordered systems*

12:15–12:45 pm  M. TIMONIN:  *Resource allocation problems in hierarchical models based on multistep Choquet integrals*

12:45 pm Lunch

02:30–03:30 pm  R. VAN DEN BRINK:  *Cooperative games with a hierarchically structured player set*

03:30–04:00 pm  N. SAGARA:  *Superlinear extensions of exact games on sigma-algebras. A probabilistic representation*

04:00 pm Coffee break

04:30–05:00 pm  J.-L. MARICHAL, P. MATHONET:  *Weighted Banzhaf power and interaction indexes through weighted approximations of games*

05:00–05:30 pm  W. SANDER:  *Interaction indices revisited*

05:30–06:00 pm  B. LLAMAZARES, P. PÉREZ-ASURMENDI, J.L. GARCÍA-LAPRESTA:  *Collective transitivity in majorities based on difference in support*

**Wednesday, February 2, 2011**

09:00–10:00 am  E. LEHRER:  *Concave integrals for capacities and its applications*

10:00–10:30 am  E. PAP:  *Min-product semiring of transition bistochastic matrices and mobility measures in social sciences*

10:30 am Coffee break

11:00–11:30 am  T. VETTERLEIN:  *Logics for arguing pro and contra*

11:30–12:00 am  J. HARDING, C. WALKER, E. WALKER:  *Bichains*

12:00–12:30 pm  Z. DARÓCZY, J. DASCĂL:  *Weighted quasi-arithmetic means as conjugate means*

12:30 pm Lunch

02:30–03:00 pm  H. BUSTINCE, J. FERNANDEZ, E. BARRENECHEA, R. MESIAR:  *Overlap functions, ignorance functions and bi-entropic functions in pairwise comparison*

03:00–03:30 pm  H. BUSTINCE, M. PAGOLA, R. MESIAR, E. HÜLLERMEIER, F. HERRERA:  *Grouping functions for fuzzy modeling of pairwise comparisons*

03:30–04:00 pm  R. MESIAR, M. KOMORNÍKOVÁ:  *Local and global classification of aggregation functions*

04:00 pm Coffee break

04:30–05:00 pm  M. COUCEIRO, E. LEHTONEN, T. WALDHAUSER:  *On the arity gap of aggregation functions*

05:00–06:00 pm  ROUND TABLE 1:  *Symbolic vs. numerical representation of preference and decision criteria*
**Thursday, February 3, 2011**

<table>
<thead>
<tr>
<th>Time</th>
<th>Speaker(s)</th>
<th>Topic</th>
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<tbody>
<tr>
<td>09:00–10:00</td>
<td>Z. AOUANI, A. CHATEAUNEUF</td>
<td>Impatience and myopia through belief functions</td>
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<tr>
<td>10:00–10:30</td>
<td>M. TAKÁCS</td>
<td>Soft computing-based risk management – fuzzy, multilevel structured decision making</td>
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<tr>
<td>11:00–11:30</td>
<td>F. DURANTE</td>
<td>Ordinal sums and shuffles of copulas</td>
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<tr>
<td>11:30–12:00</td>
<td>F. SPIZZICHINO</td>
<td>Relations between risk aversion and notions of ageing: use of semi-copulas</td>
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<tr>
<td>01:30 pm</td>
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<td>Beginning of the Social Program: Trip to Gmunden</td>
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**Friday, February 4, 2011**

<table>
<thead>
<tr>
<th>Time</th>
<th>Speaker(s)</th>
<th>Topic</th>
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<tbody>
<tr>
<td>09:00–10:00</td>
<td>M. PIRLOT</td>
<td>Conjoint measurement and valued relations</td>
</tr>
<tr>
<td>10:00–10:30</td>
<td>E. INDURAIN, D. MARTINETTI, S. MONTES, S. DÍAZ</td>
<td>Open questions concerning different kinds of fuzzy orderings</td>
</tr>
<tr>
<td>11:00–11:35</td>
<td>S. GOTTWALD</td>
<td>Local and relativized local finiteness in ( t )-norm-based structures</td>
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<tr>
<td>11:30–12:00</td>
<td>J. IGNJATOVIĆ, M. ĆIRIĆ, N. DAMLJANOVIĆ</td>
<td>Weakly linear systems of fuzzy relation inequalities and equations</td>
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<tr>
<td>12:00–12:30</td>
<td>J. DOMBI</td>
<td>Multiplicative utility function and fuzzy operators</td>
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<tr>
<td>02:30-03:30</td>
<td>B. DE BAETS</td>
<td>The God-Einstein-Oppenheimer dice puzzle</td>
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<tr>
<td>03:30-04:00</td>
<td>N. DAMLJANOVIĆ, M. ĆIRIĆ, J. IGNJATOVIĆ</td>
<td>Multivalued relations over lattices and semirings and their applications</td>
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<td>04:00 pm</td>
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<td>Coffee break</td>
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<td>04:30-05:30</td>
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<td>ROUND TABLE 2: Where do we stand on preference modeling with valued relations?</td>
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**Saturday, February 5, 2011**

<table>
<thead>
<tr>
<th>Time</th>
<th>Speaker(s)</th>
<th>Topic</th>
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<tbody>
<tr>
<td>09:00–09:30</td>
<td>J.T. DENNISTON, A. MELTON, S.E. RODABAUGH</td>
<td>Formal Concept Analysis and lattice-valued interchange systems</td>
</tr>
<tr>
<td>09:30–10:00</td>
<td>S. SOLOVJOVS</td>
<td>Variable-basis categorically-algebraic dualities</td>
</tr>
<tr>
<td>10:30–11:00</td>
<td>M. ĆIRIĆ, J. IGNJATOVIĆ, A. STAMENKOVIĆ</td>
<td>Different models of fuzzy automata and their applications</td>
</tr>
<tr>
<td>11:00–11:30</td>
<td>M. STEHLÍK, I. VAJDA</td>
<td>Why it is important to make decompositions of information divergences</td>
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<td>11:30–11:45</td>
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<td>Closing</td>
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<tr>
<td>12:00 am</td>
<td></td>
<td>Lunch</td>
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</tbody>
</table>
## List of Participants

<table>
<thead>
<tr>
<th>Name</th>
<th>Email</th>
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<tbody>
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### Conference Office / Social Programme

#### Thursday, February 3, 2011

| 17:00 – 21:00 | Conference Office / Registration  
|               | Natural Science Faculty Building - Wardrobe Auditorium Maximum  
|               | Phone +43 (0)681 10564039, +43 (0)664 4062474 |
| 18:00 – 21:00 | Informal Welcome Reception  
|               | Natural Science Faculty Building - Mensa next Auditorium Maximum |

#### Friday, February 4, 2011

| 08:30 – 13:00 | Conference Office / Registration  
|               | Faculty of Natural Science Building - Wardrobe Auditorium Maximum  
|               | Phone +43 (0)681 10564039, +43 (0)664 4062474 |
| 18:00         | Reception by the Head of the Mathematics Department in Salzburg  
|               | Natural Science Faculty Building |

#### Saturday, February 5, 2011

| 19:00 – 23:00 | Conference Dinner  
|               | Restaurant Sternbräu, Griesgasse 23, 5020 Salzburg (www.sternbrau.com) |
Scientific Programme

Sections:

1. Universal Algebra and Lattice Theory
2. Classical Algebra
3. Applications of Algebra
4. Algebraic Aspects of Mathematical Logic

Parallel talks in sections are scheduled for 20 minutes in length, followed by a 5 minute discussion period and a 5 minute break in order to allow participants to change sessions.

<table>
<thead>
<tr>
<th>Time</th>
<th>Location</th>
<th>Talk Title</th>
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<tbody>
<tr>
<td>09:15 – 09:30</td>
<td>Auditorium Maximum</td>
<td>Conference Opening</td>
</tr>
</tbody>
</table>
| 09:30 – 10:30 | Lecture Hall 402          | Ágnes Szendrei
Generating direct powers of algebras |
| 10:30 – 11:00 | Lecture Hall 402          | Coffee Break                                                     |
| 11:00 – 11:30 | Lecture Hall 402          | Sebastian Kerkhoff
Dualizing clones                                              |
|               | Lecture Hall 403          | Radomír Halaš
Effect algebras as conditionally residuated structures           |
|               | Lecture Hall 414          | Jörg Koppitz
Coregular semigroups                                            |
| 11:00 – 11:30 | Lecture Hall 402          | Mike Behrisch
On algebras derived from minimal majority clones               |
|               | Lecture Hall 403          | Miroslav Kolařík
Dynamic effect algebras                                         |
| 12:00 – 12:30 | Lecture Hall 402          | Reinhard Pöschel
Peircean algebraic logic (PAL) and relation algebras            |
|               | Lecture Hall 403          | Jan Paseka
Meager elements in Archimedean atomic lattice effect algebras   |
| 12:30 – 14:15 | Lecture Hall 402          | Lunch Break                                                       |

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<thead>
<tr>
<th>Time</th>
<th>Location</th>
<th>Speaker</th>
<th>Title of Talk</th>
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<tbody>
<tr>
<td>14:15 – 15:15</td>
<td>Auditorium Maximum</td>
<td>Hannes Leitgeb</td>
<td>Algebraic and probabilistic structures in epistemology</td>
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<tr>
<td>15:15 – 15:45</td>
<td>Coffee Break</td>
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<tr>
<td>15:45 – 16:15</td>
<td>Lecture Hall 402</td>
<td>Miguel Couceiro</td>
<td>On the arity gap of order-preserving functions</td>
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<td></td>
<td></td>
<td>Michiro Kondo</td>
<td>Weak uninorm based logic and its filter theory</td>
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<tr>
<td></td>
<td></td>
<td>Tobias Schlemmer</td>
<td>Linear extensions of partial orders on Abelian groups</td>
</tr>
<tr>
<td>16:15 – 16:45</td>
<td>Lecture Hall 403</td>
<td>Erkko Lehtonen</td>
<td>Embeddability of countable posets with finite principal ideals into partial orders induced by clones</td>
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<td>Jiří Rachůnek</td>
<td>Internal states on residuated l-monoids</td>
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<tr>
<td>16:45 – 17:15</td>
<td>Lecture Hall 414</td>
<td>Edith Mireya Vargas</td>
<td>C-clones</td>
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<td></td>
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<td>Jan Kühr</td>
<td>Lateral completions of pseudo-BCK-algebras</td>
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<tr>
<td>17:15 – 17:45</td>
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<td>Karsten Schölzel</td>
<td>Galois theory for partial clones on finite sets</td>
</tr>
</tbody>
</table>
### Saturday, February 5, 2011

<table>
<thead>
<tr>
<th>Time</th>
<th>Location</th>
<th>Speaker(s)</th>
</tr>
</thead>
</table>
| 09:15 – 10:15 | Auditorium Maximum | Tanja Lange  
*Elliptic curve cryptography* |
| 10:15 – 10:45 | Coffee Break      |                                                                            |
| 10:45 – 11:15 | Lecture Hall 402  | Anna Zamojska-Dzienio  
*A reduction theorem for finitary prevarieties* |
|             | Lecture Hall 403  | Jānis Ķīrulis  
*Orthoposets: a construction of quantifiers* |
|             | Lecture Hall 414  | Erhard Aichinger  
*A remark on the composition of polynomial functions over algebraically closed fields* |
| 11:15 – 11:45 | Lecture Hall 402  | Milan Jasem  
*Weak relativey uniform convergence in dually residuated lattice ordered semigroups* |
|             | Lecture Hall 403  | Eugene Plotkin  
*Algebraic logic and logically-geometric types in varieties of algebras* |
|             | Lecture Hall 414  | Daniel Bernstein  
*A classification of detours in proofs of the generalized Nullstellensatz* |
| 11:45 – 12:15 | Lecture Hall 402  | Peter Mayr  
*Recognizing partial term functions* |
|             | Lecture Hall 403  | Michal Botur  
*New examples of commutative basic algebras* |
|             | Lecture Hall 414  | Helmut Länger  
*The zerodivisor graph of a poset* |
| 12:15 – 14:15 | Lunch Break       |                                                                            |
### Saturday, February 5, 2011

<table>
<thead>
<tr>
<th>Time</th>
<th>Venue</th>
<th>Speakers/Positions</th>
<th>Talks/Sessions</th>
</tr>
</thead>
<tbody>
<tr>
<td>14:15 – 15:15</td>
<td>Auditorium Maximum</td>
<td>Ivan Chajda</td>
<td>Basic algebras</td>
</tr>
<tr>
<td>15:15 – 15:45</td>
<td>Cafe Break</td>
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</tr>
<tr>
<td>15:45 – 16:15</td>
<td>Lecture Hall 402</td>
<td>Eszter K. Horváth</td>
<td>CD-independent subsets in posets and in particular lattice classes</td>
</tr>
<tr>
<td></td>
<td>Lecture Hall 403</td>
<td>Dietmar Dorninger</td>
<td>On spaces of multidimensional probabilities</td>
</tr>
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<td>Lecture Hall 414</td>
<td></td>
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</tr>
<tr>
<td>16:15 – 16:45</td>
<td>Section 1</td>
<td>Filip Švrček</td>
<td>Lattice-like structures derived from rings</td>
</tr>
<tr>
<td></td>
<td>Section 3</td>
<td>Tatjana Plotkin</td>
<td>Algebraic symmetries in knowledge bases</td>
</tr>
<tr>
<td>16:45 – 17:15</td>
<td>Section 1</td>
<td>Agata Pilitowska</td>
<td>Identities in varieties generated by algebras of subalgebras</td>
</tr>
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<td></td>
<td>Section 3</td>
<td>Marcin Kozik</td>
<td>Lack of absorption and Malcev conditions</td>
</tr>
<tr>
<td>19:00 – 23:00</td>
<td>Conference Dinner</td>
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<td>Restaurant Sternbräu, Griesgasse 23, 5020 Salzburg (<a href="http://www.sternbrau.com">www.sternbrau.com</a>)</td>
</tr>
</tbody>
</table>
**Sunday, February 6, 2011**

<table>
<thead>
<tr>
<th>Time</th>
<th>Location</th>
<th>Speaker/Presenter</th>
<th>Title/Topic</th>
</tr>
</thead>
<tbody>
<tr>
<td>09:15 – 10:15</td>
<td>Auditorium Maximum</td>
<td>Goulnara Arzhantseva</td>
<td><em>Amenability and beyond</em></td>
</tr>
<tr>
<td>10:15 – 10:45</td>
<td>Lecture Hall 402</td>
<td>Karin Cvetko-Vah</td>
<td><em>On skew lattices and dual discriminator varieties</em></td>
</tr>
<tr>
<td></td>
<td>Lecture Hall 403</td>
<td>Sergejs Solovjovs</td>
<td><em>Dual attachment pairs in categorically-algebraic topology</em></td>
</tr>
<tr>
<td></td>
<td>Lecture Hall 414</td>
<td>Sinan (Ahmet) Cevik</td>
<td><em>Deficiencies on groups and monoids</em></td>
</tr>
<tr>
<td>10:45 – 11:15</td>
<td>Section 1</td>
<td>Thomas Laux</td>
<td><em>On convex subsets of a metric space</em></td>
</tr>
<tr>
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<td>Section 3</td>
<td>Rudolf Wille</td>
<td><em>Knowledge Management in University Domains</em></td>
</tr>
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<td>Section 2</td>
<td>Eylem Guzel Karpuz</td>
<td><em>Strongly $\pi$-inverse monoids under Schützenberger product</em></td>
</tr>
<tr>
<td>11:15 – 11:45</td>
<td>Coffee Break - Farewell Snacks</td>
<td></td>
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</tbody>
</table>
Abstracts

Erhard Aichinger (Johannes Kepler University Linz)

A remark on the composition of polynomial functions over algebraically closed fields

In 1969, M. D. Fried and R. E. MacRae proved that for univariate polynomials $p, q, f, g \in \mathbb{K}[t]$ ($\mathbb{K}$ a field) with $p, q$ nonconstant, $p(x) - q(y)$ divides $f(x) - g(y)$ in $\mathbb{K}[x, y]$ if and only if there is $h \in \mathbb{K}[t]$ such that $f = h(p(t))$ and $g = h(q(t))$. In 1995, F. Binder and the author provided short algebraic proofs of this theorem, and J. Schicho gave a proof from the viewpoint of category theory, thereby providing several generalizations to multivariate polynomials.

In this talk, we give an algebraic proof of one of these generalizations. The theorem by Fried and MacRae yields a way to prove the following fact for nonconstant functions $f, g$ from $\mathbb{C}$ to $\mathbb{C}$: if both the composition $f \circ g$ and $g$ are polynomial functions, then $f$ has to be a polynomial function as well. We give an algebraic proof of this fact and present a generalization to multivariate polynomials over algebraically closed fields. As an application, one obtains a generalization of a result by L. Carlitz from 1963 that describes those univariate polynomials over finite fields that induce injective functions on all of their extensions. Part of this research is joint work with S. Steinerberger (Bonn, Germany).

Goulnara Arzhantseva (Universität Wien)

Amenability and beyond

This is an expository talk on the amenability, discovered by von Neumann in 1929, and its recently appeared relatives: coarse amenability, introduced by Yu in 2000, and coarse embeddings, defined by Gromov in 1993, in relation with the Novikov conjecture.
Mike Behrisch (Technische Universität Dresden)

On algebras derived from minimal majority clones

We assign to every unitary Menger algebra of rank three an algebra of a new signature, which is a subalgebra of a certain term reduct of the given Menger algebra. The class of algebras derived in this way can be shown to be a variety and to be categorically equivalent to the full subcategory of non-terminal unitary Menger algebras of rank three that consist only of selectors and majority elements. These Menger algebras arise as ternary parts of clones generated by majority operations. The minimal clones generated by majority operations correspond to minimal such Menger algebras and to minimal derived algebras (having only trivial subuniverses, i.e. the empty set and the whole carrier set). We show that the subvariety of derived algebras generated from algebras corresponding to known minimal majority clones does not contain any new finite minimal algebras. That is, it is impossible to construct new minimal majority clones on finite sets using just the HSP-closure operator.

Daniel Bernstein (University of Illinois at Chicago)

A classification of detours in proofs of the generalized Nullstellensatz

Textbooks on commutative algebra often include a standard generalization (1947 Zariski, 1951 Goldman, 1952 Krull) of the classical Nullstellensatz. Several different several-page proofs of this generalized Nullstellensatz have appeared in the literature. It turns out that all of the proofs fit naturally into a complete lattice, where the top of the lattice is a much shorter proof of the same theorem.

Michal Botur (Palacký University Olomouc)

New examples of commutative basic algebras

Basic algebras are MV-like algebras (more precisely, algebras of type $(2, 1, 0)$) which are derived from lattices which possess an antitone involution on every principal filter. The class of all basic algebras form a variety which contains many important classes (for example Boolean algebras, MV-algebras, algebras equivalent with ortho-modular lattices or algebras equivalent with lattice ordered effect algebras). The binary operation $\oplus$ is generally non-commutative and non-associative. Basic algebras with commutative $\oplus$ (commutative basic algebras) form an important subvariety. Firstly, commutative basic algebras can be represented as non-associative residuated structures satisfying a lot of logical identities (double negation law, prelinearity, divisibility, Lukasiewicz axiom, contra-position law, ...). Simply, commutative basic algebras are natural non-associative generalizations of MV-algebras. The previous result shows that finite commutative basic algebras are necessarily associative and thus are just finite MV-algebras. Moreover, complete commutative basic algebras are subdirect products of linearly ordered ones. Although there are many papers and results which describe the class of commutative basic algebras, it is not easy find an example of a commutative basic algebra which is not an MV-algebra. Just constructions of non-associative basic algebras are the main aim of the talk. We will present new ideas and examples of non-associative and commutative basic algebras.
**Sinan Cevik** (Selcuk University)

**Deficiencies on groups and monoids**

In this talk, I would like to give some fundamental facts, theories and specific examples about deficiencies (or efficiencies) on groups and monoids. The examples on the theory will be presented by considering the split extension of a finite cyclic group by a free abelian group having rank two, and also by considering the split extension of a free abelian monoid having finite rank by a finite monogenic monoid. The main references on these two subjects can be as follows:


**Ivan Chajda** (Palacký University Olomouc)

**Basic algebras**

Basic algebras were introduced as a common generalization of MV-algebras and orthomodular lattices for the sake to give a common basis for both the multiple-valued Lukasiewicz logic and the logic of quantum mechanic. It turns out that they can be simultaneously described as bounded lattices with antitone involutions in sections (i.e. intervals \([a, 1]\) for every element \(a\)). A basic algebra is an MV-algebra if and only if it is associative and we get an identity which characterizes when it is an orthomodular lattice. Concerning the description by means of lattices with section antitone involutions, a basic algebra is an orthomodular lattice if and only if every section involution is a relative complementation and it is an MV-algebra if the lattice is distributive and it satisfies the so-called exchange condition. Varieties of basic algebras are intensively studied by the group of algebraists from UP Olomouc. Connections with so-called effect algebras (describing the domain of observables in the logic of quantum mechanics) will be presented.

**Jānis Cirulis** (University of Latvia)

**Orthoposets: a construction of quantifiers**

We show that every maximal orthogonal subset of an orthoposet induces a quantifier (a symmetric closure operator), and study the structure of the set of all quantifiers of this kind.
Miguel Couceiro (University of Luxembourg)

On the arity gap of order-preserving functions

The arity gap of a function \( f : A^n \to B \) \((n \geq 2)\) that depends on all of its variables, denoted \( \text{gap}_f \), can be defined as the minimum decrease in the number of essential variables when variables of \( f \) are identified. In this talk we briefly survey earlier and recent results concerning the arity gap of functions, and present a complete classification of order-preserving functions according to their arity gap which is shown to be either 1 or 2. In the particular case of chains \( A \) and \( B \), we obtain the following explicit description of those order-preserving functions that have arity gap 1 and those that have arity gap 2.

**Theorem.** Let \( A \) and \( B \) be chains, and \( f : A^n \to B \) be an order-preserving function. Then \( \text{gap}_f = 2 \) if and only if \( n = 3 \) and \( f = \text{med}(h(x_1), h(x_2), h(x_3)) \) for some nonconstant order-preserving unary function \( h : A \to B \) (here \( \text{med} \) denotes the median function on the range of \( h \)). Otherwise \( \text{gap}_f = 1 \).

Most of the results we are going to present were obtained in joint works with Erkko Lehtonen and Tamás Waldhauser.

Karin Cvetko-Vah (University of Ljubljana)

On skew lattices and dual discriminator varieties

In their 1995 Algebra Universalis paper Bignall and Leech investigated a certain non-commutative analogue of Boolean algebras, the so called skew Boolean intersection algebras, and proved that any algebra \( A \) in a discriminator variety with a constant term has a skew Boolean intersection algebra polynomial reduct whose congruences coincide with those of \( A \). We shall present a generalization of this result yielding a connection between meet-distributive intersection skew lattices (i.e. a non-commutative analogue of distributive lattices) and dual discriminator varieties with three constant terms.

Dietmar Dorninger (Technische Universität Wien)

On spaces of multidimensional probabilities

The probability \( p(s) \) of the occurrence of an event pertaining to a physical system which is observed in different states \( s \) determines a function \( p \) from the set \( S \) of states of the system to the unit interval \([0, 1]\). Such a function \( p \) is called a multidimensional probability or numerical event. We consider sets \( P \) of multidimensional probabilities which can be partially ordered in such a way that orthomodular posets arise. These orthoposets \( P \) are known as spaces of numerical events due to the fact that they can be regarded as a generalization of classical fields of events. Indeed, by means of spaces \( P \) of numerical events one can distinguish between the quantum mechanical and classical behaviour of a physical system. One deals with a classical system if and only if the underlying space \( P \) is a Boolean algebra. We characterize spaces \( P \) of multidimensional probabilities, provide various examples and derive necessary and sufficient conditions for a space \( P \) to be a lattice and a Boolean algebra, respectively. Moreover, we show how one can apply the obtained results to real world data.
Eylem Guzel Karpuz (Karamanoglu Mehmetbey University)

STRONGLY $\pi$-INVERSE MONOIDS UNDER SCHÜTZENBERGER PRODUCT

In [1], Ateş defined the semidirect product version of the Schützenberger product for any two monoids and examined the regularity on it. Since this is a new product and there are so many algebraic properties that need to be checked on it, in this work we determine necessary and sufficient conditions for this new version to be strongly $\pi$-inverse and inverse. Then we give some related results.


Radomír Halaš (Palacký University Olomouc)

EFFECT ALGEBRAS AS CONDITIONALLY RESIDUATED STRUCTURES

The aim of the talk is to link up the structures used in foundations of quantum logic and that arising in many-valued reasoning. We shall characterize effect and pseudoeffect algebras as conditionally residuated structures.

Eszter K. Horváth (University of Szeged)

CD-INDEPENDENT SUBSETS IN POSETS AND IN PARTICULAR LATTICE CLASSES

It is proved by G. Czédli, M. Hartmann and E. T. Schmidt that any two CD-bases in a finite distributive lattice have the same number of elements. We investigate CD-bases in posets, semilattices and lattices. It is shown that their CD-bases can be characterized as maximal chains in a related poset or lattice. We point out two known lattice classes whose CD-bases satisfy the mentioned property.

Joint work with Sándor Radeleczki.

Milan Jasem (Slovak Technical University)

WEAK RELATIVELY UNIFORM CONVERGENCE IN DUALLY RESIDUATED LATTICE ORDERED SEMIGROUPS

In this paper the notion of a weak relatively uniform convergence in dually residuated lattice ordered semigroups is introduced and basic properties of this convergence are established. Further, a Cauchy completion of a dually residuated lattice ordered semigroup is investigated.
Sebastian Kerkhoff (Technische Universität Dresden)

**Dualizing clones**

When it comes to dualizing clones, the usual approach is to consider a clone as a term algebra and then try to prove or disprove that the corresponding algebra is dualizable. In the talk, we will introduce a different and somewhat more general approach to dualizing clones. The framework is based on the idea of generalizing clones to certain sets of morphisms in categories. As we will see, we will be able to dualize any given clone over a finite set $A$ to a clone of dual operations over a structure with base set $A$. We will discuss how this approach can be used to obtain new results for clones over sets.

Miroslav Kolařík (Palacký University Olomouc)

**Dynamic effect algebras**

We introduce the so-called tense operators in lattice effect algebras. Tense operators express the quantifiers “it is always going to be the case that” and “it has always been the case that” and hence enable us to express the dimension of time in the logic of quantum mechanics. We present an axiomatization of these tense operators and prove that every lattice effect algebra whose underlying lattice is complete can be equipped with tense operators. Such an effect algebra is called dynamic since it reflects changes of quantum events from past to future.

Michiro Kondo (Tokyo Denki University)

**Weak uninorm based logic and its filter theory**

We give an axiomatic system of a logic wUL (called a *weak uninorm-based logic*), which is characterized by the class of all (not necessary integral) commutative residuated lattices. Since many well-known logics, e.g., UL by Metcalfe and Montanga, ML by Höhle, MTL by Esteva and L.Godo, BL by Hájek, are axiomatic extensions of our logic, those logics are all algebraizable. Moreover, we give an answer to the problem left open in [WK].

Jörg Koppitz (Universität Potsdam)

**Coregular semigroups**

Coregular semigroups are particular complete regular semigroups. A coregular element $s$ of a semigroup is characterized by the property $s^3 = s$. For example, such elements arise in Linear Algebra (pseudoinverse matrix). We give an introduction to the structure of coregular semigroups and characterize particular coregular transformation semigroups in order to illustrate the properties of such semigroups.

Marcin Kozik (Jagiellonian University)

**Lack of absorption and Malcev conditions**

I will present results concerning lack of absorption (as used in the algebraic approach to CSP) and its impact on the Taylor varieties.
Jan Kührl (Palacký University Olomouc)

LATERAL COMPLETIONS OF PSEUDO-BCK-ALGEBRAS

Pseudo-BCK-algebras are the residuation subreducts of integral residuated lattices. We
prove that some pseudo-BCK-algebras have a unique lateral completion, i.e., a completion
in which the initial algebra is dense and where every set of pairwise disjoint elements has
infimum.

Tanja Lange (Technische Universiteit Eindhoven)

ELLIPтиC CURVE CRYPTOGRAPHY

This talk gives an overview of several results; not all of these results are by me but several
involved me and my co-authors. In 2007 Harold Edwards’ paper “A normal form for elliptic
curves” provided a new way to write elliptic curves. This form offers many advantages for
elliptic curve cryptography but is also easier to explain to students. The main advantages
are that for suitably chosen curves the set of affine points forms an abelian group – there
is no need to consider points at infinity for explaining the group law and it is even possible
to give a single addition formula which holds without exceptions. This completeness of the
addition formula depends on the finite field and points at infinity appear after a quadratic
extension. To cover addition of any pair of points over any Edwards curve over any field it
is sufficient to consider 2 addition formulas which each hold on an open subset of $E \times E$ and
these formulas are surprisingly short. For cryptographic applications the simplicity of the
addition law translates to a particular fast algorithm to add points on the curve leading to
particularly efficient implementations. Edwards’ paper has prompted a lot of research into
alternative curve shapes for elliptic curves and many improvements were found since 2007.
A summary of the formulas can be found at http://www.hyperelliptic.org/EFD/. The
progress described thus far leads to faster implementations of key exchange and signature
schemes. Details of several implementations and speed comparisons are part of eBACS:
ECRYPT Benchmarking of Cryptographic Systems http://bench.cr.yp.to/. Elliptic
curves can also be used to attack systems: the elliptic curve method of factorization is the
best method to factor general large numbers and is an important ingredient in the number
field sieve, used to factor RSA numbers. Edwards curves lead to faster factoring methods
not only because of the better operation count but also because carefully constructed
Edwards curves have a higher probability of finding small factors. So Edwards curves turn
out to be good for ECC and bad for RSA.

Helmut Länger (Technische Universität Wien)

THE ZERODIVISOR GRAPH OF A POSET

The zerodivisor graph $G$ of a poset $(P, \leq)$ with 0 has vertex-set $P$, and different vertices
$a, b$ of $G$ are connected by an edge if 0 is the only common lower bound of $a$ and $b$. The
chromatic number and the clique number of $G$ coincide. We sketch an algebraic proof of
this result.
On convex subsets of a metric space

Let \((M, d)\) be a metric space. The associated betweenness relation \(S_d := \{(a, b, c) \in M^3 \mid d(a, c) = d(a, b) + d(b, c)\}\) gives rise to the notion of \(d\)-convex sets, which with any two points contain every point between them with respect to \(S_d\). Some properties of the hull system of \(d\)-convex subsets of \(M\) will be identified, as well as a possible way to reconstruct a generating metric for any hull system satisfying these properties.

Embeddability of countable posets with finite principal ideals into partial orders induced by clones

Two partially ordered sets are said to be equimorphic if each one can be embedded to the other. It is well-known that the set \((P_f(\omega), \subseteq)\) of finite subsets of the natural numbers, ordered by inclusion, is a countable poset, its principal order ideals are finite, and it admits an embedding of every countable poset whose principal order ideals are finite. Thus, every poset that is equimorphic to \((P_f(\omega), \subseteq)\) enjoys the same properties. Let \(C\) be a clone on \(A\), and let \(f\) and \(g\) be operations on \(A\). We say that \(f\) is a \(C\)-minor of \(g\), if \(f = g(h_1, \ldots, h_n)\) for some \(h_1, \ldots, h_n \in C\), and we denote this fact by \(f \leq_C g\). If \(f \leq_C g\) and \(g \leq_C f\), we say that \(f\) and \(g\) are \(C\)-equivalent, and we denote this fact by \(f \equiv_C g\). The relation \(\leq_C\) is a quasi-order on the set \(O_A\) of all operations on \(A\), and it induces a partial order \(\preceq_C\) on the set \(O_A/\equiv_C\) of \(C\)-equivalence classes.

**Theorem.** Let \(C\) be a clone on a finite set \(A\) with at least two elements. If

- \(C\) is a clone that contains only essentially at most unary operations; or
- \(C\) is a subclone of the clone of polynomial operations of the semimodule \((A; +, \text{End}(A))\), where \((A; +)\) is a commutative inverse monoid and \(\text{End}(A)\) is the semiring of endomorphisms of \((A; +)\), and \(C\) contains an operation of the form \(x_1 + x_2 + \cdots + x_m\), for some \(m \geq 2\); or
- \(C\) is Burle’s clone on \(A\),

then the \(C\)-minor partial order \((O_A/\equiv_C, \preceq_C)\) is equimorphic to \((P_f(\omega), \subseteq)\).

This talk is based on joint work with Ágnes Szendrei.

Algebraic and probabilistic structures in epistemology

Epistemology, one of the traditional areas of philosophy, deals with the topic of rational belief: under what conditions is it rational to hold something to be true? There are two kinds of belief that are of interest here: qualitative belief — believing that some proposition is the case — and quantitative belief (degrees of belief) — assigning subjective probabilities to propositions. While the formal theories that are underlying belief in the first sense are logical-algebraic, the mathematical theory for belief in the second sense is standard probability theory. But how do these two kinds of belief relate to each other formally? We prove that given reasonable assumptions, it is possible to give an explicit definition of qualitative belief in terms of subjective probability, such that it is neither
the case that belief is stripped of any of its usual logical properties, nor is it the case that believed propositions are bound to have probability 1. Qualitative belief is not to be eliminated in favour of degrees of belief, rather, by reducing it to assignments of consistently high degrees of belief, both quantitative and qualitative belief turn out to be governed by one unified theory. The algebraic structures of qualitative belief are to be found “within” the probabilistic structures of quantitative belief. This is but one instance of the many applications of mathematical methods in philosophy that are currently explored.

**Peter Mayr (Universidade de Lisboa)**

**Recognizing partial term functions**

Fix a finite algebra $A$. What is the complexity of deciding whether a given partial $k$-ary function on $A$ is the restriction of a term function on $A$? In 2007 Marcin Kozik constructed algebras for which this decision problem is Exptime-complete. In the same year Ross Willard observed that for groups and rings there is a polynomial-time algorithm. We show that the problem is in NP for arbitrary Malcev algebras and obtain some bounds on representations of term functions.

**Jan Paseka (Masaryk University Brno)**

**Meager elements in Archimedean atomic lattice effect algebras**

We thoroughly study the set of meager elements $M(E)$, the center $C(E)$ and the compatibility center $B(E)$ in the setting of atomic Archimedean lattice effect algebras $E$. The main result is that in this case the center $C(E)$ is bifull (atomic) iff the compatibility center $B(E)$ is bifull (atomic) whenever $E$ is sharply dominating. As a by-product, we give a new description of the smallest sharp element over $x$ in $E$ via the basic decomposition of $x$. As an application, a solution of Jenca’s question concerning the Triple Representation Theorem is given.

**Agata Pilitowska (Warsaw University of Technology)**

**Identities in varieties generated by algebras of subalgebras**

In a natural way we can “lift” any operation defined on a set $A$ to an operation on the set of all non-empty subsets of $A$ and obtain from any algebra $(A, \Omega)$ its power algebra of subsets. G. Grätzer and H. Lakser proved that for a variety $\mathcal{V}$, the variety $\mathcal{V}\Sigma$ generated by power algebras of algebras in $\mathcal{V}$ satisfies precisely the consequences of the linear identities true in $\mathcal{V}$. In particular, $\mathcal{V}\Sigma = \mathcal{V}$ if and only if $\mathcal{V}$ is defined by a set of linear identities. For certain types of algebras, the sets of their subalgebras form a subalgebra of their power algebras. They are called the algebras of subalgebras.

In this talk we present a solution of a long-standing problem concerning identities satisfied by varieties $\mathcal{V}\mathcal{S}$ generated by algebras of subalgebras of algebras in a given variety $\mathcal{V}$. We will show that if $\mathcal{V}$ is a variety of modes - idempotent and entropic algebras, then the variety $\mathcal{V}\mathcal{S}$ satisfies precisely the consequences of the idempotent and the linear identities true in $\mathcal{V}$. (Recall that an algebra is idempotent if each singleton is a subalgebra and it is entropic if any two of its operations commute.) As a consequence we obtain that in the
case of any variety of modes, $V = VS$ if and only if $V$ is defined only by idempotent and linear identities.

Joint work with A. Zamojska-Dzienio.

**Eugene Plotkin** (Bar Ilan University)

**ALGEBRAIC LOGIC AND LOGICALLY-GEOMETRIC TYPES IN VARIETIES OF ALGEBRAS**

The main objective of the talk is to show that the notion of type which was developed in the frames of logic and model theory has deep ties with geometric properties of algebras. These ties go back and forth from universal algebraic geometry to model theory through the machinery of algebraic logic. We show that types (multi-sorted types) appear naturally as logical kernels in the Galois correspondence between filters in the Halmos algebra of first order formulas with equalities and elementary sets in the corresponding affine space.

Joint work with B. Plotkin and E. Aladova.

**Tatjana Plotkin** (Bar Ilan University)

**ALGEBRAIC SYMMETRIES IN KNOWLEDGE BASES**

Knowledge base theory stimulates numerous applications of computer algebra and symbolic computations. The talk is aimed to explain how the general ideas of Galois theory work for knowledge bases and help to determine the criterion of knowledge bases informational equivalence. This criterion reduces the problem of informational equivalence of knowledge bases to the conjugacy problem for groups. We give a survey of the recent results and outline the future problems.

**Reinhard Pöschel** (Technische Universität Dresden)

**PEIRCEAN ALGEBRAIC LOGIC (PAL) AND RELATION ALGEBRAS**

An analogon to the famous Church’s thesis is Burch’s thesis stating All procedures of relational constructions are formalizable in PAL. In the talk, a short overview on PAL (Peircean Algebraic Logic) and its connections to relation algebras (clones of relations) will be given, some problems and results (obtained in the last decade) shall be reported.

**Jiří Rachůnek** (Palacký University Olomouc)

**INTERNAL STATES ON RESIDUATED ℓ-MONOIDS**

The class of bounded residuated ℓ-monoids ($Rℓ$-monoids) contains, among others, certain important classes of algebras behind fuzzy reasoning. States on $Rℓ$-monoids are analogues of probability measures. We present state $Rℓ$-monoids, i.e. $Rℓ$-monoids with a unary operator called an internal state satisfying some basic properties of states.
**Tobias Schlemmer** (Technische Universität Dresden)

**Linear extensions of partial orders on Abelian groups**

Partially ordered groups, also known as po-groups, are groups with a compatible partial order. Results from M.I. Zajceva and H.-H. Teh are combined in order to provide a full characterisation of linear order extensions of a given order on a group. In contrast to Teh this approach provides a method to discuss linear orders of different Abelian rank in a uniform manner. This will be achieved by modelling the linear orders as hyperplanes in a real vector space.

**Karsten Schölzel** (Universität Rostock)

**Galois theory for partial clones on finite sets**

We consider partial clones on finite sets and establish a Galois connection between partial clones and a new variant of relation algebras. A new elementary operation on relations captures the difference between total and partial clones and enables us to lift the proof from the total case to the partial case with minor modifications. This Galois connection encompasses all partial clones and is not restricted to strong partial clones.

**Sergejs Solovjovs** (University of Latvia)

**Dual attachment pairs in categorically-algebraic topology**

The talk continues our development of a fruitful topological theory, based in a categorically-algebraic (catalg) extension of the set-theoretic membership relation “∈”. It was inspired by the concept of quasi-coincidence between a fuzzy point and a fuzzy set, which fuzzified the neighborhood approach to topology. The lattice-valued analogue of the relation, dubbed attachment, gave rise to a functor (even an embedding) between the categories of many-valued and crisp topological spaces, thereby providing a rigid justification for the definitions of various notions of many-valued topology. During AAA80 we presented variety-based attachment, extending the obtained results to catalg topology. This talk formulates the notion of duality for the new concept. It also shows the main difference between attachment and topological system: the latter has an internal topology, and the former provides a morphism of topological theories.

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**Filip Švrček** (Palacký University Olomouc)

**Lattice-like structures derived from rings**

We study lattice-like operations that are term operations in certain rings with restricted powers of elements. We show that every commutative ring with a unit satisfying the identity \( x^{p+1} = x^p \) for some integer \( p \geq 1 \) is in fact a Boolean ring. However, if it satisfies \( x^{p+2} = x^p \) for some integer \( p \geq 2 \) then it need not be Boolean, but certain lattice-like operations can be introduced such that the original ring can be reconstructed by means of these operations. Similarly it can be done for rings satisfying the identity \( (x^p)^2 = x^p \) for some integer \( p \geq 2 \).
Ágnes Szendrei (University of Colorado at Boulder)

GENERATING DIRECT POWERS OF ALGEBRAS

For a finite algebra $A$ let $d_A(n)$ denote the size of the smallest generating set for $A^n$. It is known that the growth function $d_A(n)$ of any finite algebra $A$ is at least logarithmic, and at most exponential. We will discuss a theorem that extends the results of Hall, Wiegold, Quick–Ruškuc, Riedel, and others for groups, algebras with an underlying group structure, and algebras in congruence uniform varieties to algebras in arbitrary varieties with a cube term. We will also present the first known examples of finite algebras whose growth functions are neither logarithmic nor linear nor exponential.

Joint with K. A. Kearnes and E. W. Kiss.

Edith Mireya Vargas (Technische Universität Dresden)

C-clones

We study a restricted version of the Galois connection between polymorphisms and invariants, called $\text{Pol} - \text{CInv}$, where the invariant relations are restricted to so-called clausal relations. The lattice of all clones arising from this Galois connection, denominated $C$-clones, is investigated. All co-atoms in the lattice of all $C$-clones are characterized.

Rudolf Wille (Technische Universität Darmstadt)

KNOWLEDGE MANAGEMENT IN UNIVERSITY DOMAINS. A SYSTEMATIC ORIENTATION.

In the nineties, business companies have recognized in an increasing measure that knowledge is an important resource for the success of companies. Therefore, large exertions have been made at many places to build up a successful knowledge management in companies; for this, it was first of all necessary to localize, to systematize, to care for and to pass on knowledge suitably. Today substantial perceptions and experiences are already present in considerable size about the effective creation of organizational knowledge management. This knowledge about knowledge management in business is deepened and developed in university domains first of all in operating managements, but also reflected by psychological and social institutes and through research. Vicariously, three books shall here be named which generally inform about economical knowledge management:

- G. Probst, S. Raub, K. Romhardt: Managing knowledge: how companies use optimally their most valuable resource [PRR 99].
- T. H. Davenport, L. Prusak: When your company would know what it knows ...: The practice for knowledge management [DP 98].
- K. Devlin: Infosense. Turning information into knowledge [De 99].

Anna Zamojska-Dzienio (Warsaw University of Technology)

A REDUCTION THEOREM FOR FINITARY PREVARIETIES

An abstract class of algebraic systems of a given signature is a finitary prevariety, if it is closed under taking substructures and finite Cartesian products. A finitary prevariety
consisting of finite members of some class is called a *pseudo-quasivariety*. V. A. Gorbunov proved a so-called reduction theorem for pseudo-quasivarieties. More specifically, he has proved that the prevariety lattice of any pseudo-quasivariety of a signature with finitely many relation symbols is an inverse limit of finite lower bounded lattices. In this talk, we provide a more general setting for that reduction theorem proving it for finitary prevarieties without putting any restriction on signature. Gorbunov’s reduction theorem follows then as a corollary.

Joint work with Marina Semenova.
List of Participants

Orest Artemovych - Cracow University of Technology, Poland
Gábor Bacsó - Hungarian Academy of Sciences, Hungary
Teresa Biegańska - Jan Długosz University, Poland
Anna Bień - University of Silesia, Poland
Jānis Cirulis - University of Latvia, Latvia
Kazimierz Czarnota - University of Warsaw, Poland
Katarzyna Domańska - Jan Długosz University, Poland
Paweł Dudek - University of Technology in Częstochowa, Poland
Wojciech Dzik - University of Silesia, Poland
Artur Gola - Jan Długosz University, Poland
Anetta Górnicka - Jan Długosz University, Poland
Rafał Gruszczynski - Nicolaus Copernicus University, Poland
Joanna Grygiel - Jan Długosz University, Poland
Katarzyna Grygiel - Jagiellonian University, Poland
Artur Jakubski - University of Technology in Częstochowa, Poland
Adam Kolany - Higher Vocational State School in Nowy Sącz, Poland
Zofia Kostrzycka - Opole University of Technology, Poland
Mirosław Kurkowski - University of Technology in Częstochowa, Poland
Miriam Makinson - Paris, France
Ángela Mestre - CELC, University of Lisbon, Portugal
Yutaka Miyazaki - Osaka University of Economics and Law, Japan
Raja Natarajan - Tata Institute of Fundamental Research, Mumbai, India
Miroslav Navara - Czech Technical University, Czech Republic
Marek Nowak - University of Łódź, Poland
Andrzej Pietruszczak - Nicolaus Copernicus University, Poland
Jurij Povstenko - Jan Długosz University, Poland
Adam Sadowski - University of Technology in Częstochowa, Poland
Olga Siedlecka - University of Technology in Częstochowa, Poland
Robert Sochacki - University of Opole, Poland
Sergejs Solovjovs - University of Latvia, Latvia
Bogdan Staruch - University of Warmia and Mazury, Poland
Bożena Staruch - University of Warmia and Mazury, Poland
Lidia Stępień - Jan Długosz University, Poland
Marcin Stępień - Częstochowa, Poland
Ireneusz Szcześniak - University of Technology in Częstochowa, Poland
Oleg Tikhonenko - University of Technology in Częstochowa, Poland
Iwona Tyrała - Jan Długosz University, Poland
Paweł Waszkiewicz - Jagiellonian University, Poland
Bożena Woźnia-Szcześniak - Jan Długosz University, Poland
Marek Zajonc - Jagiellonian University, Poland
Agnieszka Zbrzezny - Jan Długosz University, Poland
Andrzej Zbrzezny - Jan Długosz University, Poland
Marcin Ziolkowski - Jan Długosz University, Poland
Monday, March 7th

from 14:00 Registration — hotel "FIAN"
Tuesday, March 8th

**MORNING SESSION**

9.50 Opening

10.00 Jānis Čīrulis
    *Orthoposets with quantifiers*

10.45 Bożena Staruch, Bogdan Staruch
    *On maximal possible congruences for partial algebras*

11.15 Coffee break

11.45 Marek Nowak
    *On an archetypal representation of Galois connections for complete lattices*

12.30 Orest Artemovych
    *FC-rings*

**AFTERNOON SESSION**

15.00 Yutaka Miyazaki
    *Graph theory and modal logic*

15.45 Zofia Kostrzycka
    *On some interesting properties of some uninteresting logics*

16.15 Coffee break

16.45 Sergejs Solovjovs
    *Functorial semantics of topological theories*

17.15 Adam Kolany
    *DPLL - Procedure for generalised satisfiability on hypergraphs*
Wednesday, March 9th

MORNING SESSION

9.30  Paweł Waszkiewicz  
*Fixed points in quantale-enriched categories*

10.15  Raja Natarajan  
*CAS versus ITP*

11.00  Coffee break

11.30  Mirko Navara  
*Vector techniques in fuzzy arithmetic*

12.15  Rafał Gruszczynski, Andrzej Pietruszczak  
*Sums, fusions and aggregates in theories of parthood*

20.00 CONFERENCE DINNER
Thursday, March 10th

MORNING: TRIP

AFTERNOON SESSION
15.00 Marcin Ziółkowski
   Some generalization of M/M/n/m queuing systems with non-homogenous servers

15.45 Olga Siedlecka-Lamch
   A bisimulation relation for selected types of probabilistic and quantum automata

16.15 Coffee break

16:45 Gabor Bacsó
   Upper chromatic number of finite projective planes

17.30 Anna Bień
   Methods of reduction of singular graphs

18.00 Ângela Mestre
   Riordan arrays via the classical umbral calculus
Friday, March 11th

MORNING SESSION
10.00 Ireneusz Szcześniak
   Accuracy evaluation of a method for calculating routing probabilities

10.30 Bożena Woźna-Szcześniak, Andrzej Zbrzezny
   A translation of the existential model checking problem for MITL to the existential model checking problem for X-LTL

11.00 Bożena Woźna-Szcześniak, Agnieszka Zbrzezny
   SAT-based BMC for the existential part of Real-Time CTLK

11.30 Coffee break

12.00 Mirosław Kurkowski, Paweł Dudek
   A SAT-based analysis of some cryptographic systems

12.30 Adrian Sadowski, Artur Jakubski
   Testing satisfiability of logical formulas and verifying tautologies using programmable devices

AFTERNOON SESSION (IN POLISH)
15.30 Robert Dyja, Artur Jakubski
   A picture that is something more than just a picture

16.00 Artur Gola
   Object Detection in Colour Images by use of Fuzzy Sets and Fuzzy Relations

16.30 Oleg Tikhonenko
   Single-server queueing systems with random capacity customers

17.00 Coffee break

17.30 Katarzyna Domańska
   On some addition formulas which are fulfilled by homographic type functions

18.00 Kazimierz Czarnota
   How a snake can eat itself — a formal description. As an analogy — what a system can tell about itself
Saturday, March 12th

**MORNING SESSION**

10.00 Jurij Povstenko  
*Dirichlet and Neumann boundary-value problems for diffusion-wave equation*

10.45 Lidia Stępień, Marcin Ryszard Stępień  
*Automatic search of strong authomorphisms of Witt rings*

11.15 Coffee break

11.45 Wojciech Dzik  
*Unifiers in some weakly regular algebras*

12.15 Joanna Grygiel  
*Numerical characterization of finite distributive lattices by means of their weighted double skeletons*
Participants

Workshop
"Algebra and its applications"
April 29 – May 1, 2011, Daugavpils, Latvia

1. Zsolt Balogh (Hungary). Lie nilpotency index in group algebras Abstract
2. Jānis Ķīrulis (Latvia). A topological representation of residuation subreducts of residuated integral porgroupoids Abstract
3. Peteris Daugulis (Latvia). On an axiomatic definition of the determinant Abstract
4. Tibor Juhász (Hungary). Derived lengths in group algebras Abstract
5. Kalle Kaarli (Estonia). Title of the talk: TBA
6. Oleg Košik (Estonia). Categorical equivalence of finite semilattices
7. Kaie Kubjas (Germany). Title of the talk: TBA
8. Vladimir Kuchmei (Estonia). Title of the talk: TBA
10. Riivo Must (Estonia). Title of the talk: TBA
15. Sergejs Solovjovs (Latvia). On some properties of the category of extended-order algebras Abstract
16. Lauri Tart (Estonia). Rees matrix covers and strong Morita equivalence of partially ordered semigroups Abstract
17. Laur Tooming (Estonia). Title of the talk: TBA