

## **Fuzzy algebraic and relational structures – theory and applications**

Session organizers:

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### Abstract

Since the beginning of fuzzy era algebraic and relational structures have been investigated in this new framework. Dealing with substructures and relations as subsets of the domain's square, researchers were generalizing these to functions with values in the unit interval and lately in various lattices. Along with theoretical investigations, applications turn out to be widely used. E.g., fuzzy semigroups and monoids are used in automata theory, in formal languages, for linguistic variables etc.; fuzzy relational structures are applied in fuzzy controllers, and generally in artificial intelligence. In particular, new methods concerning different fuzzy products of relations and solutions of relational equations are shown to be very effective in the mentioned applications. Finally the lattice valued approach, with residuated and connected lattices as the structure of membership values turn out to be more suitable in this framework, generalizing the unit interval as the co-domain.

The aim of the session is to bring together researchers dealing with fuzzy algebras and relational structures (especially related to many valued logic) in order to discuss new results and problems, in both theory and applications i.e. to amalgamate some recent theoretical and empirical contributions that reflect current results in these areas.

### Topics:

- Fuzzy algebraic structures and connected algebras: fuzzy semigroups, monoids, groups, semirings, and others
- Fuzzy relations and relational structures including fuzzy posets, lattices, fuzzy relational equations and inequalities
- Applications of the above to automata theory, formal languages, control theory and other
- Fuzzy structures with different membership values arising from lattices: residuated lattices, lattice ordered monoids and other.

### Keywords:

- Fuzzy algebraic structures
- Fuzzy relational structures
- Fuzzy relational equations and inequalities

- Fuzzy automata, fuzzy control problems
- Fuzzy logic
- Algebraic logic
- Fuzzy mathematics
- Soft computing
- Non-classical logic
- (fuzzy) hyper structures
- Rough set

### **Programme Committee**

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### **Biographies of organizers:**

**Arsham Borumand Saeid** received his Ph.D. in Mathematics (Algebraic structure) at Iran in 2004. He is currently associate professor at the Department of Mathematics in Shahid Bahonar University of Kerman, Iran. His research interests are in: Fuzzy Algebraic structures, Universal Algebra, algebraic logic, BL-algebra, hyper algebraic structure. He has been teaching several courses to bachelor, master and doctoral students

of Mathematics. He published about 100 research papers in international journals and conference and work with many journals as referee or editorial board member.

**Branimir Seselja** is the head of Chair in applied algebra at the Department of Mathematics and Informatics, Faculty of Sciences, University of Novi Sad, Serbia. His specialization is Universal algebra, Lattice theory and algebraic aspects of Fuzzy set theory. He has published more than 100 articles in journals specialized in the above topics, he has given many invited lectures at universities worldwide, participated at numerous conferences. Among his publications is a monograph on weak congruences (together with A. Tepavcevic), Lattice theory, and several overview texts on algebraic aspects of fuzziness (<http://www.im.ns.ac.yu/Faculty/seseljab>).

**Andreja Tepavcevic** got her Ph. D. in Mathematics 1993 at University of Novi Sad, Serbia. She is a professor at Faculty of Science in Novi Sad since 2003. Her research interests are in: Fuzzy Set Theory, Universal Algebra, Lattice Theory and applications. She has been teaching several courses to bachelor, master and doctoral students of Applied Mathematics and Biology, supervised two Ph.D., three master and three graduate thesis and was an external adviser of one doctoral thesis and one master thesis defended abroad. She is an author of about 80 research papers and five university textbooks. She participated at about 60 conferences and gave invited lectures at about 15 universities and was a member of organizing and program committees for several seminars and conferences.

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