Algebraic Functions

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Algebraic functions are those that can be implicitly defined over a certain algebra (or class of algebras) by equational conditions (EFDs). They emerged naturally from the study of classes axiomatizable by $\forall\exists!$-sentences [1] and have shown a great potential in unearthing new interesting algebraic structures and shedding new light on already known classes of algebras [3], [2], as well as giving rise to a number of very attractive problems.

For any algebra A the algebraic functions on A form a clone that contains the clone of term-operations of A. This fact makes it possible to describe the algebraic functions on a given algebra by exhibiting generators for this clone. Algebraic functions on an algebra A have several interesting properties, and behave in some aspects as if they were term-functions, thus making them natural additions to the set of basic operations of A.

There are particular insightful connections between the study of classes axiomatizable by EFDs (called algebraically expandable classes) and the algebraic clones of the algebras belonging to those classes.

An introduction to the field and its main problems will be given, and some of its main tools will be shown, along with applications to the characterization of algebraic functions over some well-known algebraic structures.

References

[1] Campercholi M., Vaggione D. : *Algebraically Expandable Classes*, Algebra Universalis, ISSN 0002-5240, 2008.

[2] Campercholi M., Vaggione D. : *An implicit function theorem for regular fuzzy logic functions* Fuzzy Sets and Systems, n.159 p.2983-2987, ISSN 0165-0114, 2008.

[3] Campercholi M., Vaggione D. : *Algebraically expandable classes of implication algebras* lecture given at the International Conference in Residuated Structures: Algebra and Logic, 2008.