Full PDF

DM-GAA Page

FUNCTION CLASSES AND RELATIONAL CONSTRAINTS STABLE UNDER COMPOSITIONS WITH CLONES

MIGUEL COUCEIRO

University of Luxembourg, Mathematics Research Unit
6, rue Richard Coudenhove-Kalergi L–1359 Luxembourg, G.-D. Luxembourg

e-mail: miguel.couceiro@uni.lu

AND

STEPHAN FOLDES

Institute of Mathematics, Tampere University of Technology
PL553, 33101 Tampere, Finland

e-mail: sf@tut.fi

Abstract

The general Galois theory for functions and relational constraints over arbitrary sets described in the authors' previous paper is refined by imposing algebraic conditions on relations.

Keywords: function classes, right (left) composition, Boolean function, invariant relations, relational constraints.

2000 Mathematics Subject Classification: 06E30.

REFERENCES

[1] M. Couceiro and S. Foldes, *Definability of Boolean function classes by linear equations over GF(2)*, Discrete Applied Mathematics **142** (2004), 29–34.

[2] M. Couceiro and S. Foldes, On affine constraints satisfied by Boolean functions, Rutcor Research Report 3-2003, Rutgers University,
`http://rutcor.rutgers.edu/~rrr/`.

[3] M. Couceiro and S. Foldes, *On closed sets of relational constraints and classes of functions closed under variable substitutions,* Algebra Universalis **54** (2005), 149–165.

[4] M. Couceiro and S. Foldes, *Functional equations, constraints, definability of function classes, and functions of Boolean variables,* Acta Cybernetica **18** (2007), 61–75.

[5] O. Ekin, S. Foldes, P.L. Hammer and L. Hellerstein, *Equational characterizations of Boolean function classes,* Discrete Mathematics **211** (2000), 27–51.

[6] S. Foldes and P.L. Hammer, *Algebraic and topological closure conditions for classes of pseudo-Boolean functions,* Discrete Applied Mathematics **157** (2009), 2818–2827.

[7] D. Geiger, *Closed systems of functions and predicates,* Pacific Journal of Mathematics **27** (1968), 95–100.

[8] L. Lovász, *Submodular functions and convexity* pp. 235–257 in: Mathematical Programming-The State of the Art, A. Bachem, M. Grötschel, B. Korte (Eds.), Springer, Berlin 1983.

[9] N. Pippenger, *Galois theory for minors of finite functions,* Discrete Mathematics **254** (2002), 405–419.

[10] R. Pöschel, *Concrete representation of algebraic structures and a general Galois theory,* Contributions to General Algebra, Proceedings Klagenfurt Conference, May 25–28 (1978) 249–272. Verlag J. Heyn, Klagenfurt, Austria 1979.

[11] R. Pöschel, A general Galois theory for operations and relations and concrete characterization of related algebraic structures, Report R-01/80, Zentralinstitut für Math. und Mech., Berlin 1980.

[12] R. Pöschel, *Galois connections for operations and relations*, in Galois connections and applications, K. Denecke, M. Erné, S.L. Wismath (eds.), Mathematics and its Applications, Kluwer Academic Publishers, Dordrecht 2004.

[13] L. Szabó, *Concrete representation of related structures of universal algebras,* Acta Sci. Math. (Szeged) **40** (1978), 175–184.