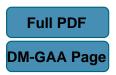
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## LATTICES OF RELATIVE COLOUR-FAMILIES AND ANTIVARIETIES

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## Abstract

We consider general properties of lattices of relative colour-families and antivarieties. Several results generalise the corresponding assertions about colour-families of undirected loopless graphs, see [1]. Conditions are indicated under which relative colour-families form a lattice. We prove that such a lattice is distributive. In the class of lattices of antivarieties of relation structures of finite signature, we distinguish the most complicated (universal) objects. Meet decompositions in lattices of colour-families are considered. A criterion is found for existence of irredundant meet decompositions. A connection is found between meet decompositions and bases for anti-identities.

**Keywords:** colour-family, antivariety, lattice of antivarieties, meet decomposition, basis for anti-identities.

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## References

- V.A. Gorbunov and A.V. Kravchenko, Universal Horn classes and colourfamilies of graphs, Algebra Universalis 46 (1-2) (2001), 43–67.
- [2] V.A. Gorbunov and A. V. Kravchenko, Universal Horn classes and antivarieties of algebraic systems, Algebra Logic 39 (1) (2000), 1–11.

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- [3] L. Lovász, Operations with structures, Acta Math. Acad. Sci. Hung. 18 (3–4) (1967), 321–328.
- [4] D. Duffus and N. Sauer, Lattices arising in categorial investigations of Hedetniemi's conjecture, Discrete Math. 152 (1996), 125–139.
- [5] J. Nešetřil and C. Tardif, Duality theorems for finite structures (charaterising gaps and good characterisations), J. Combin. Theory, B 80 (1) (2000), 80–97.
- [6] R. Balbes and Ph. Dwinger, *Distributive lattices*, Univ. Missouri Press, Columbia, MI, 1974.
- [7] G. Grätzer, *General Lattice Theory*, Birkhäusser, Basel 1998.
- [8] A. Pultr and V. Trnková, Combinatorial, algebraic and topological representations of groups, semigroups and categories, Academia, Prague 1980.
- [9] Z. Hedrlín, On universal partly ordered sets and classes, J. Algebra 11 (4) (1969), 503-509.
- [10] J. Nešetřil, Aspects of structural combinatorics (Graph homomorphisms and their use), Taiwanese J. Math. 3 (4) (1999), 381–423.
- [11] J. Nešetřil and A. Pultr, On classes of relations and graphs determined by subobjects and factorobjects, Discrete Math. 22 (3) (1978), 287–300.
- [12] A.V. Kravchenko, On lattice complexity of quasivarieties of graphs and endographs, Algebra and Logic 36 (3) (1997), 164–168.
- [13] V.A. Gorbunov and A.V. Kravchenko, Universal Horn logic, colour-families and formal languages, General Algebra and Applications in Discrete Mathematics (Proc. Conf. General Algebra Discrete Math.), Shaker Verlag, Aachen, 1997, pp. 77–91.
- [14] D.P. Smith, Meet-irreducible elements in implicative lattices, Proc. Amer. Math. Soc. 34 (1) (1972), 57–62.
- [15] S.S. Goncharov, Countable Boolean Algebras and Decidability, Plenum, New York-London-Moscow 1997.
- [16] H. Rasiowa and R. Sikorski, The mathematics of metamathematics, Panstwowe Wydawnictwo Naukowe, Waszawa 1963.
- [17] C. Tardif and X. Zhu, The level of nonmultiplicativity of graphs, Discrete Math. 244 (2002), 461–471.

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