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On the maximal minimal cube lengths in distinct DNF tautologies. (English) Zbl 1449.05018

DML, Discrete Math. Lett. 2, 47-51 (2019).

Summary: Inspired by a recent article by *A. Zaleski* and *D. Zeilberger* ["Boolean function analogs of covering systems", Preprint, arXiv:1801.05097], we investigate the question of determining the largest k for which there exist Boolean formulas in disjunctive normal form (DNF) with n variables, which are tautologies, whose conjunctions have distinct sets of variables, and such that all the conjunctions have at leastkliterals. Using a SAT solver, we answer the question for some sizes which Zaleski and Zeilberger [loc. cit.] left open. We also determine the corresponding numbers for DNFs obeying certain symmetries.

MSC:

05A15 Exact enumeration problems, generating functions
68W30 Symbolic computation and algebraic computation

Keywords:

covering systems; SAT solving; symmetry breaking

Software:

CaDiCaL; Lingeling; Plingeling; Treengeling; YalSAT

Full Text: Link arXiv

References:

[1] M. Artin,Algebra, Prentice Hall, New Jersey, 1991.

[2] A. Biere, CaDiCaL, lingeling, plingeling, treengeling, YalSAT entering the SAT competition 2017,Proceedings of SAT Competition 2017 - Solver and Benchmark Descriptions, 2017.

[3] A. Biere, M. Heule, H. Van Maaren, T. Walsh (Eds.),Handbook of Satisfiability,Vol. 185 of Frontiers in Artificial Intelligence and Applications, IOS Press, Amsterdam, 2009. · Zbl 1183.68568

[4] J, Chen, A new SAT encoding of the at-most-one constraint,Proceedings of the Tenth International Workshop of Constraint Modelling and Reformulation, 2010.

[5] P. Erd˝os, On integers of the form2k+pand some related problems,Summa Brasil. Math.2(1950) 113-123.

[6] A. M. Frisch, P. A. Giannaros, SAT encodings of the at-most-kconstraint: some old, some new, some fast, some slow,Proceedings of the Tenth International Workshop of Constraint Modelling and Reformulation, 2010.

[7] D. E. Knuth,The Art of Computer Programming,Vol. 4, Fascicle 6: Satisfiability, Addison-Wesley, Boston, 2015.

[8] K. A. Sakallah, Symmetry and satisfiability, In: A. Biere, M. Heule, H. Van Maaren, T. Walsh (Eds.),Handbook of Satisfiability,Vol. 185 of Frontiers in Artificial Intelligence and Applications, IOS Press, Amsterdam, 2009.

[9] A.

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