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MSC:

- 68Q25 Analysis of algorithms and problem complexity
- 03B70 Logic in computer science
- 06A15 Galois correspondences, closure operators (in relation to ordered sets)
- 08A70 Applications of universal algebra in computer science
- 68Q60 Specification and verification (program logics, model checking, etc.)

Cited in 1 Document

Keywords:

Galois connection; quantified constraints; universal algebra; computational complexity; logic in computer science

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References:

- [1] L. Barto, M. Kozik, and T. Niven, \textit{The CSP dichotomy holds for digraphs with no sources and no sinks (a positive answer to a conjecture of Bang-Jensen and Hell)}, SIAM J. Comput., 38 (2009), pp. 1782–1802, . . Zbl 1191.68460
- [2] M. Bodirsky, M. Hermann, and F. Richoux, \textit{Complexity of existential positive first-order logic}, in Proceedings of the 5th Conference on Computability in Europe, 2009, pp. 31–36. . Zbl 1268.03048
- [3] F. Börner, \textit{Total multifunctions and relations}, in AAA60: Workshop on General Algebra, Dresden, 2000.
- [4] F. Börner, A. A. Bulatov, H. Chen, P. Jeavons, and A. A. Krokhin, \textit{The complexity of constraint satisfaction games and QCSP}, Inform. and Comput., 207 (2009), pp. 923–944. . Zbl 1188.68269
- [5] A. Bulatov, P. Jeavons, and A. Krokhin, \textit{Classifying the complexity of constraints using finite algebras}, SIAM J. Comput., 34 (2005), pp. 720–742, . . Zbl 1071.08002
- [6] A. A. Bulatov, \textit{A dichotomy theorem for constraint satisfaction problems on a 3-element set}, J. ACM, 53 (2006), pp. 66–120. . Zbl 1316.68057
- [7] A. K. Chandra and P. M. Merlin, \textit{Optimal implementation of conjunctive queries in relational data bases}, in Proceedings of the Ninth Annual ACM Symposium on Theory of Computing, J. E. Hopcroft, E. P. Friedman, and M. A. Harrison, eds., 1977, pp. 77–90.
- [8] H. Chen, \textit{Quantified constraint satisfaction and 2-semilattice polymorphisms}, in Proceedings of the 10th International Conference on Principles and Practice of Constraint Programming, Lecture Notes in Comput. Sci. 3258, M. Wallace, ed., Springer, 2004, pp. 168–181. . Zbl 1152.68546
- [9] H. Chen, \textit{The complexity of quantified constraint satisfaction: Collapsibility, sink algebras, and the three-element case}, SIAM J. Comput., 37 (2008), pp. 1674–1701, . . Zbl 1151.68025
- [10] H. Chen, \textit{A rendezvous of logic, complexity, and algebra}, ACM Comput. Surv., 42 (2009), 2.
- [11] H. Chen, \textit{Meditations on quantified constraint satisfaction}, in Logic and Program Semantics, Springer, 2012, pp. 35–49. . Zbl 1354.68113
- [12] N. Creignou, S. Khanna, and M. Sudan, \textit{Complexity Classifications of Boolean Constraint Satisfaction Problems}, SIAM, 2001, . . Zbl 0981.68058
- [13] V. Dalmau, \textit{Some Dichotomy Theorems on Constant-Free Quantified Boolean Formulas.}, Tech. Report LSI-97-43-R., Departament LSI, Universitat Pompeu Fabra, Barcelona, 1997.
- [14] T. Feder and M. Y. Vardi, \textit{The computational structure of monotone monadic SNP and constraint satisfaction: A study through datalog and group theory}, SIAM J. Comput., 28 (1998), pp. 57–104, . . Zbl 0914.68075
- [15] E. Grädel, P. G. Kolaitis, L. Libkin, M. Marx, J. Spencer, M. Y. Vardi, Y. Venema, and S. Weinstein, \textit{Finite Model Theory and Its Applications}, Texts Theoret. Comput. Sci. EATCS Ser., Springer, 2007. . Zbl 1133.03001
- [16] P. Hell and J. Nešetřil, \textit{On the complexity of H-coloring}, J. Combin. Theory Ser. B, 48 (1990), pp. 92–110.
- [17] M. Hermann and F. Richoux, \textit{On the computational complexity of monotone constraint satisfaction problems}, in Proceedings of the Third International Workshop on Algorithms and Computation, 2009, pp. 286–297. . Zbl 1211.68218
- [18] W. Hodges, \textit{Model Theory}, Encyclopedia Math. Appl. 42, Cambridge University Press, 1993.
- [19] P. Jeavons, D. A. Cohen, and M. Gyssens, \textit{Closure properties of constraints}, J. ACM, 44 (1997), pp. 527–548. . Zbl

- [20] P. G. Kolaitis and M. Y. Vardi, \textit{Conjunctive-query containment and constraint satisfaction}, J. Comput. System Sci., 61 (2000), pp. 302–332. · [Zbl 0963.68059](#)
- [21] M. Krasner, \textit{Une généralisation de la notion de corps}, J. Math. Pures Appl., 9 (1938), pp. 367–385. · [Zbl 64.0086.03](#)
- [22] N. A. Lynch, \textit{Log space recognition and translation of parenthesis languages}, J. ACM, 24 (1977), pp. 583–590. · [Zbl 0401.68051](#)
- [23] F. R. Madelaine and B. Martin, \textit{The complexity of positive first-order logic without equality}, in Proceedings of the 24th Annual IEEE Symposium on Logic in Computer Science, 2009, pp. 429–437.
- [24] F. R. Madelaine and B. Martin, \textit{A tetrachotomy for positive first-order logic without equality}, in Proceedings of the 26th Annual IEEE Symposium on Logic in Computer Science, M. Grohe, ed., 2011, pp. 311–320.
- [25] F. R. Madelaine and B. Martin, \textit{The complexity of positive first-order logic without equality}, ACM Trans. Comput. Log., 13 (2012), 5. · [Zbl 1351.68119](#)
- [26] F. R. Madelaine and B. Martin, \textit{Containment, equivalence and coreness from CSP to QCSP and beyond}, in Proceedings of the 18th International Conference on Principles and Practice of Constraint Programming, Springer, 2012, pp. 480–495.
- [27] B. Martin, \textit{Dichotomies and duality in first-order model checking problems}, in Logic and Theory of Algorithms, Springer, 2008, pp. 417–427. · [Zbl 1142.68439](#)
- [28] B. Martin, \textit{First-order model checking problems parameterized by the model}, in Logic and Theory of Algorithms, Lecture Notes in Comput. Sci. 5028, A. Beckmann, C. Dimitracopoulos, and B. Löwe, eds., Springer, 2008, pp. 417–427. · [Zbl 1142.68439](#)
- [29] B. Martin, \textit{The lattice structure of sets of surjective hyper-operations}, in Proceedings of the 16th International Conference on Principles and Practice of Constraint Programming, Lecture Notes in Comput. Sci. 6308, D. Cohen, ed., Springer, 2010, pp. 368–382.
- [30] B. Martin, \textit{QCSP on partially reflexive forests}, in Proceedings of the 17th International Conference on Principles and Practice of Constraint Programming, Lecture Notes in Comput. Sci. 6876, J. H.-M. Lee, ed., Springer, 2011, pp. 546–560. · [Zbl 1401.68124](#)
- [31] B. Martin and F. R. Madelaine, \textit{Towards a trichotomy for quantified \textit{h}-coloring}, in Proceedings of the Second Conference on Computability in Europe, Lecture Notes in Comput. Sci. 3988, A. Beckmann, U. Berger, B. Löwe, and J. V. Tucker, eds., Springer, 2006, pp. 342–352. · [Zbl 1145.68436](#)
- [32] B. Martin and J. Martin, \textit{The complexity of positive first-order logic without equality II: The four-element case}, in Proceedings of the 24th International Workshop on Computer Science Logic, Lecture Notes in Comput. Sci. 6247, A. Dawar and H. Veith, eds., Springer, 2010, pp. 426–438. · [Zbl 1287.68065](#)
- [33] T. Schaefer, \textit{The complexity of satisfiability problems}, in Conference Record of the Tenth Annual ACM Symposium on Theory of Computing, 1978, pp. 216–226. · [Zbl 1282.68143](#)
- [34] M. Y. Vardi, \textit{The complexity of relational query languages (extended abstract)}, in Proceedings of the 14th Annual ACM Symposium on Theory of Computing, H. R. Lewis, B. B. Simons, W. A. Burkhard, and L. H. Landweber, eds., 1982, pp. 137–146.

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