

## KNOWLEDGE BASES AND AUTOMORPHIC EQUIVALENCE OF MULTI-MODELS VERSUS LINEAR SPACES AND GRAPHS

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### Abstract

The paper considers an algebraic notion of automorphic equivalence of models and of multi-models. It is applied to the solution of the problem of informational equivalence of knowledge bases. We show that in the case of linear subjects of knowledge the problem can be reduced to the well-known in computational group theory problems about isomorphism and conjugacy of subgroups of a general linear group.

**Keywords:** knowledge base, information equivalence.

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### REFERENCES

- [1] J.J. Cannon and D.F. Holt, *Automorphism group computation and isomorphism testing in finite groups*, *J. Symbolic Comput.* **35** (3) (2003), 241–267.
- [2] J.E. Humphreys, *Introduction to Lie Algebras and Representation Theory*, Graduate Texts in Mathematics, 9, Springer-Verlag, New York 1972.
- [3] M. Knyazhansky, *Categorical Model of Knowledge Base and its Applications to Knowledge Bases Equivalence Verification* Ph.D.Thesis, Bar Ilan University (2009) submitted.

- [4] M. Knyazhansky and T. Plotkin, *Automorphic equivalence of multi-models recognition*, Armenian Journal of Mathematics **1** (2) (2008), 10–24.
- [5] M. Krasner, *Généralisation abstraite de la théorie de Galois*, Colloque Int. du CNRS (Algèbre et théorie des nombres) **24** (1949), 163–168.
- [6] E.A. O’Brien, *Isomorphism testing for  $p$ -groups*, J. Symbolic Comput. **16** (3) (1993), 305–320.
- [7] B. Plotkin, *Universal Algebra, Algebraic Logic and Databases*, Kluwer 1993.
- [8] B. Plotkin, *Seven Lectures in Universal Algebraic Geometry*, Preprint, Arxiv math, GM/0204245 (2002) 87pp.
- [9] B. Plotkin and T. Plotkin, *Geometrical aspect of databases and knowledge bases*, Algebra Universalis **46** (2001), 131–161.
- [10] B. Plotkin and T. Plotkin, *An algebraic approach to knowledge bases equivalence*, Dordrecht, Holland, Acta Applicandae Mathematicae **89** (2005), 109–134.
- [11] B. Plotkin and T. Plotkin, *Categories of elementary sets over algebras and categories of elementary algebraic knowledge*, LNCS, Springer-Verlag, **4800** (2008), 555–570.
- [12] C.M. Roney-Dougal, *Conjugacy of subgroups of the general linear group*, Experiment. Math. **13** (2) (2004), 151–163.
- [13] C.C. Sims, *Computation with Finitely Presented Groups*. Cambridge University Press (1994) xiii+604 pp.
- [14] A. Tarski, *Logic, Semantics, Metamathematics*, Oxford University Press, Oxford 1983. Second edition, (First edition 1956).
- [15] M.V. Volkov, *The finite basis problem for finite semigroups*, Sci. Math. Jpn., **53** (1) (2001), 171–199.

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