

Friday, 19 November 2021:

Aleksey V. Tarasov (Moscow, Federal Educational and Methodological Association of Universities in the field of information security)

«Boolean bijunctive functions and the systems of Boolean equations generated by them».

Abstract. The report is devoted to the results of the study of Boolean bijunctive functions. The class of bijunctive functions (functions, which can be represented as 2-CNF) is one of the Schaefer classes generating polynomial solvable systems of Boolean equations. A number of tasks related to these functions are difficult to solve. These include, in particular, the problem of finding the weight of a function by its 2-CNF, known as the problem #2-SAT. At the same time, 2-CNFs representing bijunctive functions admit a compact representation in the form of oriented graphs. The report discusses methods of effective estimation of the weight of bijunctive functions. This problem is actually equivalent to the problem of estimating the number of solutions of a Boolean binomial system of equations. Since the class of bijunctive functions belongs to the Schaefer classes, the report discusses the relationship of the class of bijunctive functions with other Schaefer classes. The central result here is a description of transformation groups of an n -dimensional vector space that stabilize a set of bijunctive functions of n variables and a number of its subsets. The third part of the report is devoted to the study of the parameters of the maximum likelihood method for solving systems of Boolean equations generated twice by bijunctive functions, that is, such bijunctive functions, the negation of which is also a bijunctive function.