

АННОТАЦИИ СТАТЕЙ НА АНГЛИЙСКОМ ЯЗЫКЕ

Alekseev E. K. **ON SOME MEASURES OF NONLINEARITY FOR BOOLEAN FUNCTIONS.** A nonlinearity measure is defined for a Boolean function f as a distance from f to the set of algebraic degenerated functions. Relations between this measure and some early offered measures of the nonlinearity are considered. Also, we investigate the order of algebraic degeneration of those functions which are mostly close to f .

Keywords: *nonlinearity of Boolean functions, algebraic degenerated functions, linear structures space, cryptography.*

Devyanin P. N. **FORMATION OF A DICTIONARY OF TERMS IN THE THEORY OF MODELING THE SECURE ACCESS AND INFORMATION FLOWS CONTROL IN COMPUTER SYSTEMS.** The work presents a dictionary project for the theory of modeling the secure access and information flows control in computer systems. The purpose of the dictionary formation is to define the main notions and terms in the computer security for using in science and education. The dictionary is created on the basis of the terminology existing in standards, in the classical models and in the DP-models of the computer security.

Keywords: *computer security, access control, information flows, DP-model, dictionary.*

Bykova V. V. **FPT-ALGORITHMS AND THEIR CLASSIFICATION ON THE BASIS OF ELASTICITY.** We give a brief overview of the results and problems of parameterized algorithmics as the new direction of computational complexity theory. For a parameterized algorithm, we offer a new indicator of computational complexity which can be used to measure the growth rate of its complexity function depending on many variables. This indicator is a partial elasticity of the complexity function. We offer a two-dimensional classification of parameterized algorithms with the complexity function having a multiplicative form of presentation.

Keywords: *computation complexity, parameterized algorithms, elasticity of algorithms.*

Berlinkov M. V. **A NOTE ON POLYNOMIAL APPROXIMATION OF SYNCHRONIZING OPTIMAL COLORING.** A strongly connected aperiodic directed graph with constant out-degree is called admissible. An automaton A is a coloring of admissible graph G if the underlying graph of A equals G . A word is called synchronizing for an automaton A if it takes A to a one particular state no matter of the starting state. Optimal coloring of admissible graph G is a synchronizing coloring with shortest reset word among all synchronizing colorings of G . The length of the corresponding reset word is called optimal coloring value. We prove that unless $\mathcal{P} = \mathcal{NP}$, no polynomial-time algorithm approximates optimal coloring or optimal coloring value within a factor less than 2 in the 3-letter alphabet case. We also extend this result to the 2-letter alphabet case.

Keywords: *road coloring problem, optimal coloring, synchronizing automata.*

Salii V. N. **SKELETON AUTOMATA.** A skeleton automaton is an automaton in which the relation of mutual accessibility of states is the identity relation. We prove that automata that admit a regular enumeration of states are exactly skeleton automata. It is shown how for a given automaton one can construct an automaton with minimal number of states that

has the same subautomata lattice, and is necessarily a skeleton automaton. A procedure is proposed to obtain a skeleton automaton from a given automaton by removal of minimal number of arcs in its transition diagram.

Keywords: *automaton, strongly connected automaton, skeleton automaton, regular enumeration of states, subautomata lattice.*

Abrosimov M. B. **MINIMAL EDGE EXTENSIONS OF ORIENTED AND DIRECTED STARS.** A complete description of all minimal edge k -extensions of oriented and directed stars is given.

Keywords: *star graph, minimal edge extension, fault tolerance.*

Vlasova A. V. **ATTRACTORS OF DYNAMICAL SYSTEMS ASSOCIATED WITH CYCLES.** We prove a theorem that describes attractors of dynamical systems associated with cycles. States of such a system are binary vectors of a given dimension, and evolutionary function transforms vectors according to the following rules: if both the initial component is 0 and the final one is 1 they are replaced by 1 and 0 respectively and all digrams 10 are replaced simultaneously by 01.

Keywords: *attractor, dynamical system, evolutionary function.*

Karmanova E. O. **ON CONGRUENCES OF PATHS.** A congruence of a path is an equivalence relation on the set of path's vertices all of whose classes are independent subsets. It is shown that each connected graph is a quotient-graph of a suitable path. Valuations are established for the minimal length of a chain whose quotient-graph is a given graph.

Keywords: *path, congruence, quotient-graph, tree, star.*

Fomichev V. M. **THE ESTIMATES OF EXPONENTS FOR PRIMITIVE GRAPHS.** The estimates of exponents of n -vertex primitive digraphs and undirected graphs are improved. The digraphs considered contain two prime contours with coprime lengths l and λ . For them, accessible estimates of the order $O(\max\{\lambda, f(l, \lambda, n)\})$ are obtained, where $f(l, \lambda, n)$ is a linear polynomial. The exponent of undirected graph is no more $2n - l - 1$, where l is the length of the longest cycle with odd length in graph. Primitive digraphs with maximal exponent $(n^2 - 2n + 2, H. Wielandt, 1950)$ and undirected graphs with maximal exponent $(2n - 2)$ are completely described.

Keywords: *graph exponent, primitive graphs.*

Bandman O. L., Kinelovsky S. A. **CUMULATIVE SYNTHESIS: A CELLULAR-AUTOMATA MODEL OF PHYSICAL-CHEMICAL PROCESSES ON THE STAGE OF POWDER REVETMENT COLLAPSING.** A discrete mathematical model is proposed which is intended for computer simulation of physical-chemical processes in a powder mixture under the impact pressure produced by the explosion. The model is a two-dimensional "Lattice-Gas" cellular automaton with hexagonal structure of the discrete space in the plane perpendicular to the direction of emerging jet. The powder grains are simulated by "particles" of a Lattice-Gas model, having different mass for different powder substances and capable to enter in chemical interactions. Program implementation of cellular automaton evolution is done for five cases, differing by the angles between the front of impact pressure wave and the direction of emerging powder jet. Simulation aimed to investigate the production of tungsten carbides when the mixture of powdered tungsten and carbon are used. Relative amount of carbides WC and W_2C obtained by simulation are compared to those produced in natural tests, which allowed to specify previously unknown cellular automata model coefficients.

Keywords: *cumulative synthesis, cellular automaton, Lattice-gas model, tungsten carbides.*