

**PROBLEMS OF SYNTHESIS AND ANALYSIS OF THE SYSTEM BEHAVIOUR  
CONTROL THEORY ON THE BASIS OF FUNCTIONAL REDUNDANCY  
PROPERTIES FOR THE CLASS OF GROUP AUTOMATA**

©2009 A. A. Sytnik<sup>1</sup>, T. E. Shulga<sup>2</sup>, N. S. Vagarina<sup>2</sup>

<sup>1</sup>Saratov State Technical University

<sup>2</sup>Saratov State Socio-Economical University

The possibility of controlling the behaviour of the discrete type systems on the basis of functional redundancy properties is investigated. To form the required output combination of reactions only the properties of the current law of functioning due to the time reserve available at the given moment or artificially created are used for this type of control. A finite determinate automaton is considered as a mathematical model of the system, while the theory of universal enumerating automata is used as the basis for solving the problem. The paper presents a solution of synthesis and analysis problem of the universal automata theory for the class of group automata. A free distributed function library for working with group automata is developed and described.

*Behaviour control, functional redundancy, group automaton, universal enumerability, GAP function library.*

**Sytnik Alexander Alexandrovitch**, doctor of technical sciences, professor, full member of Russian Academy of Natural Sciences, first deputy rector, Saratov State Technical University, e-mail: [sytnika@sstu.ru](mailto:sytnika@sstu.ru). Area of research: discrete mathematics, mathematical methods and models of complex systems, modern educational technologies.

**Shulga Tatiana Erikhovna**, candidate of physical and mathematical science, dean of the faculty of information science and information technologies, Saratov State Socio-Economical University, e-mail: [shulga@ssea.runnet.ru](mailto:shulga@ssea.runnet.ru). Area of research: mathematical cybernetics, theory of automata, theory of system control, information technologies in education.

**Vagarina Natalya Sergeyevna**, candidate of physical and mathematical science, deputy director of the Information Educational centre “Virtual branch of the Russian museum”, Saratov State Socio-Economical University, e-mail: [vagarina@ssea.runnet.ru](mailto:vagarina@ssea.runnet.ru). Area of research: mathematical cybernetics, theory of automata, group theory, information technologies in education.