

Foreword to the Special Issue “Arithmetical Logic in Control Systems”

This special issue is dedicated to the 100th anniversary of *M.A. Gavrilov*, who had contributed much to the development of the theory of logical design of digital devices. He laid the foundation for the Russian school of applied methods of logic.

Arithmetical logic is the extension of Boolean algebra due to introduction of arithmetical operations for representing logical functions as integer functions (boolean-to-integer functions). In many cases, this is useful in manipulating and transforming data in CAD IC systems. The effectiveness of algorithms used in this area perceptibly depends on data structure (description in terms of normal forms, cubes, vector representation, etc.). Interest in arithmetical expressions is stimulated by the following factors.

(1) By their nature, arithmetical expressions admit parallel computation and development of switching functions, in particular, with several outputs (systems of functions).

(2) Their field of application covers testing and verification of logical circuits, and digital integral circuits in general.

(3) They admit representation by linear decision diagrams, which are boundary cases of the decision diagrams used in logical design and helpful in solving the problem of large coefficients of logical polynomials.

Many of our colleagues took part in preparing this special issue. Some of them are reviewers. We express our indebtedness to them for their help, specially to Professor *V. Shmerko* (Canada), for their assistance and support in preparing this issue.

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