

SYNTHESIS OF OPTIMAL COMPUTING STRUCTURES OF COMPUTER SYSTEMS IN SYSTEM OF RESIDUAL CLASSES

Yanko A.

National University «Yuri Kondratyuk Poltava Polytechnic», Poltava, Ukraine

Krasnobayev V.

V. N. Karazin Kharkiv National University, Kharkiv, Ukraine

In the design and operation of real-time computer systems and components of fast processing of integer data (CSCPID) there is a necessity not only to ensure the required reliability by redundancy, but also to produce it as cheap as possible. At the same time, for CSCPID, it is necessary to take into account limitations in size, weight, consumed electricity, cost and other characteristics [1]. In other words, an optimal reservation problem arises.

For the convenience of taking these restrictions into account, in the general case we will consider only one limiting factor, regardless of what it is — cost, weight, overall dimensions, etc. With such a formulation of the question the following two main tasks can be solved:

Ensure the specified probability of system uptime at the minimum cost of reserve elements.

- ensure the specified probability of system uptime at the minimum cost of reserve elements;

- ensure the highest possible probability of system failure-free operation at a given cost of backup elements [2].

To solve these problems, it is convenient to use the method of coordinate-wise steepest descent [3].

The very process of the synthesis of the optimal reservation of CSCPID in SRC represented as an iterative process. Thus, on the basis of the results of solving the problem of optimal redundancy in system of residual classes (SRC), mathematical models of fail-stability of CSCPID for l – byte machine words were developed. Using the research results, reliability structures were obtained, on the basis of which the structures of fault-tolerant CSCPIDs were synthesized.

References

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