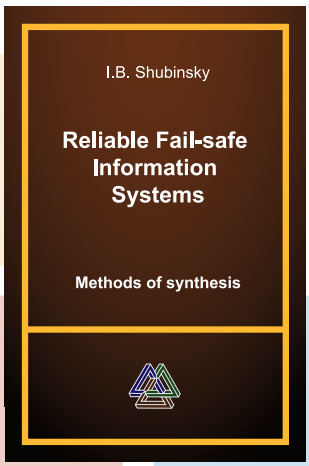
НАДЁЖНОСТЬ
DEPENDABILITY SCIENTIFIC-TECHNICAL JOURNAL
ISSN 1729-2646

REPRESENTS



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+7 (495) 967-77-05, ext.186
+7-916-105-81-31
(Patrikeeva Evgenia)

E.Patrikeeva@gismps.ru,
www.dependability.pro

Journal Dependability Ltd,
109029, Moscow,
Nizhegorodskaya str.27, bldg.1, office 209
Tel./fax: +7 499 262 53 20
E-mail: E.Patrikeeva@gismps.ru

Igor B. Shubinsky

RELIABLE FAIL-SAFE
INFORMATION SYSTEMS
Methods of synthesis

Copy deadline 12.02.2016. format of the edition 70x100/16.
Offset printing. Offset paper. Conv. Sheet. P. 17,55.
Circulation of 700 copies. Order number 1452.

I.B.Shubinsky

Reliable Fail-safe Information Systems

2016

The book describes conceptual provisions to ensure structural and functional reliability of information systems at all stages of a life-cycle. It represents different types of redundancy taking into account limited efficiency of the failure detection system. Under these conditions a broad-based assessment of their efficiency is performed, with determination of capabilities of structural redundancy with an endless number of standby facilities. Ways to ensure functional reliability of software are represented, including the recommendations for the development of software programs requirement specification, with the description of the process of a reliable program architecture development and well proven rules and recommendations used for design and implementation of software, as well as for integration with system hardware.

The book also presents theoretical and practical provisions of adaptive fault tolerance (active protection) of information systems, including the methods and disciplines of active protection, as well as the ways of implementation. A method of synthesis of active protection and the results of research of information system reliability with various disciplines of active protection are offered. There are also certain assessments of the efficiency of active protection in relation to the traditional methods of structural redundancy.

You can find the description of the principles to ensure functional safety of information systems, with a substantiation of the possibility to restart independent channels in two-channel safe systems. The rules of determination of the allowed time for a guaranteed detection of single and double hazardous failures are developed, including the method of synthesis of a combined two-level information system developed with higher functional safety requirements.

To prove the conformance of reliability with functional safety the method of accelerated field testing of the information system has been developed. The book contains the description of this method, including the example of its practical implementation. You will also find the information about the procedures of certification tests based on the requirements of information safety and software certification conformance.

A checklist of the most complex and significant subjects is provided at the end of each chapter. The book is primarily intended for experts who are engaged in practical development, manufacture, operation and updating of information. It is intended for researchers in the field of structural reliability of different discrete systems, academic staff, post-graduate students and students specializing in the field of information systems and as well as those working in the field of automated control systems.

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e-mail: E.Patrikeeva@gismps.ru, www.dependability.pro