

2015 IEEE East-West Design & Test Symposium (EWDTs 2015)

Batumi, Georgia
26 – 29 September 2015



IEEE Catalog Number: CFP15DTW-POD
ISBN: 978-1-4673-7777-5

**Copyright © 2015 by the Institute of Electrical and Electronics Engineers, Inc
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

******This publication is a representation of what appears in the IEEE Digital Libraries. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP15DTW-POD
ISBN (Print-On-Demand):	978-1-4673-7777-5
ISBN (Online):	978-1-4673-7776-8

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

CONTENTS

Overview Study on Fault Modeling and Test Methodology

Development for FinFET-Based Memories....1

Tshagharyan G., Harutyunyan G., Shoukourian S., Zorian Y.

An efficient approach for memory repair by reducing the number of spares....5

**Vrezh Sargsyan, Valery Vardanian, Samvel Shoukourian, Yervant Zorian,
Avetik Yessayan**

A Power Based Memory BIST Grouping Methodology....9

Martirosyan L., Harutyunyan G., Shoukourian S., Zorian Y.

An Automated Fault Injection for Evaluation of LUTs Robustness

In An SRAM-Based FPGAs....13

Anis Souari, Claude Thibeault, Yves Blaqui  re, Raoul Velazco

Modeling Transistor Level Masking of Soft Errors

in Combinational Circuits....17

Ihsen Alouani, Smail Niar, Yassin El-Hillali and Atika Rivenq-Menhaj

Evaluation of Error Effects on a Biomedical System....21

Bagalini E., Violante M., Hakobyan H.

Low Power Duty Cycle Adjustment Simple Method

In High Speed Serial Links....25

Vazgen Melikyan, Arthur Sahakyan, Arsen Hekimyan, Davit Trdatyan

Aram Shishmanyan, Tigran Khazhakyan

Clock Gating and Multi-VTH Low Power Design Methods

Based on 32/28 nm ORCA Processor....29

Vazgen Melikyan, Davit Babayan, Eduard Babayan, Poghos Petrosyan,

Anush Melikyan, Edvard Mkrtchyan

Accurate Reference Current Generation Method and Circuit in CMOS....33

Mkrtchyan E., Melikyan V., Martirosyan A., Babayan D., Asatryan A., Melikyan N.

Integrated Up/Down Switched Capacitor Converter

with Full Digital Feedback Control and Output Voltage Regulation....37

Vache Galstyan

Design of Blocks for a Field Programmable Mixed Array (FPMA)....41
Ata Sarrafinazhad, Ismail Kara, Faik Baskaya

Yaliny's Protocol for Low Earth Orbit Satellites....47
Igor Dvoryaninov

Mobile Communication System with a Hybrid Phased Array Antenna System....50
Andrey Ivanov, Vadim Teplyakov, Vladimir Kalinin

High-Speed Mobile Satellite Communication: Technologies and Challenges....54
Vadim Teplyakov

Test Program Generation for Mixed-Signal Integrated Circuits
Based on Automata Network....58
Sergey Mosin

Modified Hybrid Active Noise Control System....64
Victor I. Djigan, Alexey A. Petrovsky, Jingfan Qin, Yang Song

Secure Environment Establishment for FPGA-based Safety-Critical Systems....70
Vyacheslav Kharchenko, Andriy Kovalenko, Vladimir Sklyar

Next Generation of Architecture for Precise Time Measurements....75
Jiri Dostal, Vladimir Smotlacha

Quality Improvement of Analog Circuits Fault Diagnosis
Based on ANN Using Clusterization as Preprocessing....78
Sergey Mosin

Control Vector Structure for a Minimal-Time Circuit Optimization Process....82
Zemliak A., Reyes F., Markina T.

«Quantum» Processor for Digital Systems Analysis....86
Vladimir Hahanov, Wajeb Gharibi, Igor lemelianov, Dmitry Shcherbin

Speed-Independent Floating Point Coprocessor....93
**Stepchenkov Y.A., Zakharov V.N., Rogdestvenski Y.V., Diachenko Y.G.,
Morozov N.V., Stepchenkov D.Y.**

«Quantum» Structures for Digital Systems Synthesis....97
Wajeb Gharibi, Vladimir Hahanov, Eugenia Litvinova, Ivan Hahanov

Structural CDC Analysis Methods....N/A

Sergiy Zaychenko, Pavlo Leshtaev, Bogdan Gureev, Maksym Shliakhtun

A Sandboxing Method to Protect Cloud Cyberspace....104

Alexander Adamov, Anders Carlsson

CyUni Service – Smart Cyber University....107

**Vladimir Hahanov, Svetlana Chumachenko, Alexander Mishchenko,
Mazen Abdelrahman Abdelaziz Hussein, Anastasya Hahanova, Inna Filippenko**

Cell Library for Speed-Independent VLSI....115

**Stepchenkov Y.A., Zakharov V.N., Diachenko Y.G.,
Morozov N.V., Stepchenkov D.Y.**

Sum Code Formation with Minimum Total Number of Undetectable Errors

in Data Vectors....119

Dmitry Efanov, Vladimir Sapozhnikov, Valery Sapozhnikov, Dmitry Nikitin

Method for Functional Testing Critical Control Systems....127

Konstantin Gerasimenko, Vladimir Hahanov, Tamer Bani Amer, Aleksey Pryimak

New Sum Code for Effective Detection of Double Errors in Data Bits....132

Valery Sapozhnikov, Dmitry Efanov, Vladimir Sapozhnikov, Vyacheslav Dmitriev

Hardware Accelerator for Biological Protein Sequence Alignment on
Reconfigurable Networks-on-Chip....138

Mehdi Modarressi, Faezeh Faghih, Maryam Modarressi

Localization in MISO Airborne Passive Radar through Heavy Ground Clutters....142

Mohammad J. Ahmadi, Rouhollah Amiri, Fereidoon Behnia

Real-Time State-of-Energy Estimation of Supercapacitor-based Energy Storage....146

Noam Reichbach, Sergei Kolesnik and Alon Kuperman

Process Variation-Aware Approximation for Efficient Timing Management of
Digital Circuits....150

Mohsen Faryabi, Hamed Dorost, Mehdi Modarressi, Sied Mehdi Fakhraie

Cloud Service – Cyber Social Democracy and Smart University....154

**Vugar Abdullayev, Vladimir Hahanov, Eugenia Litvinova, Dahiri Farid,
Anton Arefiev, Yulia Hahanova**

Modular Sum Codes in Building Testable Discrete Systems....159

Valery Sapozhnikov, Vladimir Sapozhnikov, Dmitry Efano

Modification of the Architecture of a Distributed Arithmetic....166

Vladislav Lesnikov, Tatiana Naumovich, Alexander Chastikov

An Automated Technique for Design of Custom Network-on-Chip Topologies....170

Bykov S.O., Mosin S.G.

Collision Avoidance Spectrum Sharing Technique Using GFDM for Cognitive
Wireless Ad-hoc Networks....173

Anton Chistyakov

Classification of Structures of IIR Digital Filters....177

Vladislav Lesnikov, Tatiana Naumovich, Alexander Chastikov

Design and research of portable RFID localization system....182

**Yuri Gimpilevich, Vladimir Iskiv, Yuri Mickhayluck, Alexandr Savochkin,
Andrey Schekaturin, Andrey Lukyanchikov, Eduard Levin**

Towards Simplification of Timed Automata....N/A

Maxim Gromov

Fully Delay and Multiple Stuck-at Faults Testable FSM Design....186

Matrosova A., Andreeva V., Tomkov V.

FSMTest-1.0: a manual for researches....190

Shabaldina N., Gromov M.

Conversion of the Harmonic Signal of Limited Duration

by the Sampling Theorem for all Permitted Values of the Band Index....194

Gamlet S. Khanyan

Simulation of a hierarchical routing protocol for MANET....N/A

Prozorov D.E., Metelyov A.P., Chistyakov A.V., Romanov S.V.

PLL System with a Broad Band of Initial Mismatches....199

Prokopenko N.N., Zh. Sukhinets A., Gulin A. I.

Automatic Transformation of SystemC Designs to Speed Up Simulation....203

Maxim Petrov, Kirill Gagarski, Mikhail Moiseev

The Reconfigurable Radiation-Hardened Differential Difference Operational Amplifier and its Main Connection Circuits in Sensor Systems....207
Prokopenko N.N., Dvornikov O.V., Butyrlagin N.V., Pakhomov I.V.

Measurement-Based MOSFET Model for Helium Temperatures....211
Vadim N. Biryukov, Alexandr M. Pilipenko

Research of the DC-DC Converters Based on a Charge Pump for Power Sources from Environment....215
Korshunov A.V., Volobuev P.S., Lyubchik K.S.

Analytical solution of the FWM problem for co-propagating laser beams under phase mismatching....219
Vyacheslav A. Trofimov, Igor E. Kuchik

Exploring of Equivalent Circuit Model of Piezoelectric Energy Harvesters for Ultra Low-Power Devices....223
Korshunov A.V., Volobuev P.S.

Synthesis of combinational circuits from truth tables in the “Kovcheg” CAD design flow....N/A
Aleshina V., Frolov S., Makarceva M., Golenkevich A.

Multifunctional digital microcircuits for standard logic functions implementation developed on the basis of 5521 series gate array....227
Brazhnikov S.S., Konovalov V.S., Konyakhin V.V.

Simultaneous Logic and Layout Synthesis for Fin-fet Based Elements with Regular Layout in Polysilicon and Diffusion....N/A
Sergey Gavrilov, Galina Ivanova

Decreasing the length of Adaptive Distinguishing Experiments for Nondeterministic Merging-free Finite State Machines....230
Nina Yevtushenko, Natalia Kushik

Analysis and Design of Planar Flexible Antenna Prototype....N/A
Aleksandr Timoshenko, Ksenia Lomovskaya, Aleksandr Levanov, Egor Borodulin, Egor Belousov

A Resource Approach to on-Line Testing of Computing Circuits....234
Drozd J., Drozd A., M. Al-dhabi

Functional Approach in Self-Timed Circuit Design....240
Plekhanov L.P., Zakharov V.N., Stepchenkov Y.A.

Fault-tolerant High Performance Scheme Design....244
Matrosova A., Ostanin S., Kirienko I., Nikolaeva E.

Multiple Stuck-at Fault Testability of a Combinational Circuit Derived by
Covering ROBDD Nodes by Invert-And-Or Sub-circuits....248
Matrosova A., Mitrofanov E., Shah T.

Improving the eyes localization algorithm for face recognition systems....252
Vladimir Khryashchev, Andrey Priorov, Olga Stepanova, Igor Kosterin

A Fault-Tolerant Combinational Circuit Design....256
Ostanin S., Kirienko I., Lavrov V.

Computer model of steganographic system based on contraction mapping
with stream audio container....N/A
Shakurskiy M.V., Shakurskiy V.K., Volovach V.I.

The Use of Petri Nets as the Basis of Algorithm
for Gate Level Digital Circuits Simulation....N/A
Lapin A.V., Bulakh D.A., Korshunov A.V., Kazennov G.G.

Estimation of the Measurement Accuracy of the Informative Parameters
of the Signal on the Background of Correlated Additive non-Gaussian Noise....N/A
Artyushenko V. M., Volovach V. I.

The Radiation-Hardened Instrumentation Amplifier Based on the Differential
Difference Operational Amplifier for BiJFET Technological Process....260
Titov A.E., Prokopenko N.N., Zhebrun E.A., Butyrlagin N.V.

The Peculiarities of the Structural Optimization of the Energy-Efficient
Precision ARC-Filters on the Base of Classical and Differential Difference
Operational Amplifiers....264
Krutchinsky S.G., Prokopenko N.N., Zhebrun E.A., Butyrlagin N.V.

Standalone Functional Verification of Multicore Microprocessor Memory
Subsystem Units Based on Application of Memory Subsystem Models....268
Irina Stotland, Aleksey Meshkov, Vitaly Kutsevol

On using ABC for deriving distinguishing sequences for Verilog-descriptions....272
Natalia Kushik, Nina Yevtushenko, Stanislav N. Torgaev, Nikita Shatilov

Experimental evaluation of FSM-based test derivation strategy for telecommunication protocols....276
Forostyanova M.

Combined Approach to Place Electronic Computing Equipment Circuit Elements....280
Vladimir Kureichik, Vladimir Kureichik Jr., Zaruba D.V.

Design of Test Generator for Embedded Self-testing....285
Sergey Rodzin

Simplification of the scheme of the self-tested detector (m, n)-code....289
Butorina N.

Radiophysical Processes in the Nonlinear Parametrical Zonal Systems in Highest Zones of Instability of Electromagnetic Oscillations of Microwave and THz-Ranges Realized on Thin-Film Structures....N/A
Dmitry A. Bezuglov, Gennady P. Sinyavsky, Alexander N. Zaichenko, Larissa V. Cherkesova, Alexander G. Shein, George N. Shalamov, Olga N. Manaenkova

Survey on Designing a CAD Model for GaN HEMT Based on Measurements....293
Egor Belousov, Aleksandr Timoshenko, Ksenia Lomovskaya

Solution of an Optimal Control Problem with Mathcad....298
David Devadze, Marina Abashidze, Vakhtang Beridze

Example of multiparameter measurements and transmit signals by microcontroller singl-board for embedded systems....N/A
Zaza Davitadze

The methods of intellectual processing of video frames to enhance their semantic integrity and efficiency of delivery in aeromonitor systems....N/A
Barannik V.V., Ryabukha Yu.N., Hahanova A.V., Musienko A.P.

A mathematical model of the process of transferring video....N/A
Vladimir Barannik, Vladimir Larin, Anna Hahanova, Sergey Podlesny

Synthesis of Combined Cryptocompressed Systems for Providing Safety Video Information in Infocommunications....N/A
Vladimir Barannik, Sergey Sidchenko, Ivan Tupitsya, Sergey Stasev

Combined method for localization of mobile objects....303

Volodymyr Rustinov, Adnan Khamad, Anton Sorokin, Emmanuel Darlington

Optimization Criteria of Electronic Circuit Design and Algorithm of

Parameter Definition....N/A

Mikheil Donadze

WebLab Distance Learning Technology for Technical Courses Experiments....N/A

Zaza Davitadze, Guladi Phartenadze

Digital Adaptive System of Power Amplifier Linearization....309

Natalya V. Gudkova, Vladimir M. Chuykov, Ksenya V. Besklubova