2013 11th East-West Design and Test Symposium

(EWDTS 2013)

Rostov-on-Don, Russia
27-30 September 2013

IEEE

IEEE Catalog Number: CFP13DTW-POD
ISBN: 978-1-4799-2097-6

CONTENTS

Impact of Process Variations on Read Failures in SRAMs **1**
Harutyunyan G., Shoukourian S., Vardanian V., Zorian Y.

Noise Effect Estimation and Reduction in High-Speed Voltage Controlled Oscillators **5**
Vazgen Melikyan, Abraham Balabanyan, Armen Durgaryan

A Probabilistic Approach for Counterexample Generation to Aid Design Debugging **9**
Payman Behnam, Hossein Sabaghian-Bidgoli, Bijan Alizadeh, Kamyar Mohajerani, Zainalabedin Navabi

Functional Fault Model Definition for Bus Testing **14**
Elmira Karimi, Mohamad Hashem Haghbayan, Adele Maleki, Mahmoud Tabandeh

Evolution of von Neumann's Paradigm: Dependable and Green Computing **18**
Kharchenko V., Gorbenko A.

Quantum Technology for Analysis and Testing Computing Systems **24**
Wajeb Gharibi, Hahanov V.I., Anders Carlsson, Hahanova I.V., Filippenko I.V.

Diversity Assessment of Multi-Version NPP I&C Systems: NUREG7007 and CLB-BASED Techniques **29**
Kharchenko V., Duzhyi V., Sklyar V., Volkoviy A.

Features of Design, Implementation, and Characterization of On-Chip Antennas for Microwave Frequencies **34**
Aleksandr Timoshenko, Ksenia Lomovskaya, Mikhail Suslov

Design and Optimization of a Planar UWB Antenna **39**
Eng Gee Lim, Zhao Wang, Gerry Juans, Ka Lok Man, Nan Zhang, Vladimir Hahanov, Eugenia Litvinova, Svetlana Chumachenko, Mishchenko Alexander, Dementiev Sergey

Cloud Traffic Control System **44**
Hahanov V.I., Guz O.A., Ziarmand A.N., Ngene Christopher Umerah, Arefjev A.

Cloud Infrastructure for Car Service **50**
Litvinova E.I., Englesy I.P., Miz V.A., Shcherbin D.

Quantum Computing Approach for Shortest Route Finding **58**
Volodymyr Hahanov, Volodymyr Miz

Quantum Modeling and Repairing Digital Systems **61**
Baghdadi Ammar Awni Abbas, Hahanov V.I., Palanichamy Manikandan, Litvinova E.I., Dementiev S.

Quantum Models for Description of Digital Systems **67**
Hahanov V.I., Hahanova I.V., Litvinova E.I., Priymak A., Elena Fomina,

Maksimov M., Tiecoura Yves, Malek Jehad Mohammad Jararweh

Blind Least Mean Square Criterion Algorithms for Communication Adaptive Arrays **76**
Victor I. Djigan

Estimation of structural complexity of IIR digital filters **81**
Vladislav A. Lesnikov, Alexander V. Chastikov, Tatiana V. Naumovich

ASICPlacementAnalyzer: Software Tool for Data Analysis and Visualization of ASIC Placement **86**
Victor M. Kureichik, Maria V. Lisyak

Statistical Characteristics of Envelope Outliers Duration of non-Gaussian Information Processes **90**
Artyushenko V. M., Volovach V. I.

Simulation Features of Diffusion Doping Process by Means of Software Package of Synopsys Company **94**
Lagunovich N.L., Borzdov V.M., Turtsevich A.S.

Microwave Selective RC Amplifiers with Control Parameters **97**
Prokopenko N.N., Krutchinsky S.G., Budyakov P.S.

Methodology to Design-For-Testability Automation for Mixed-Signal Integrated Circuits **101**
Sergey Mosin

Static Analysis of HDL Descriptions: Extracting Models for Verification **107**
Alexander Kamkin, Sergey Smolov, Igor Melnichenko

Fault-Injection Testing: FIT-Ability, Optimal Procedure and Tool for FPGA-Based Systems SIL Certification **111**
Kharchenko V., Sklyar V., Odarushchenko O., Ivasuyk A.

Query Optimization Based on Time Scheduling Approach **116**
Wajeb Gharibi, Ayman Mousa

Analysis of Error-Detection Possibilities of CED Circuits Based on Hamming and Berger Codes **123**
Valery Sapozhnikov, Vladimir Sapozhnikov, Dmitry Efanov, Anton Blyudov

Low-Power Design of Combinational CMOS Networks **131**
Dmitry Cheremisinov, Liudmila Cheremisinova

IGBT on SOI. Technology and Construction Investigation **135**
Ivan Lovshenko, Vladislav Nelayev, Sergey Shvedov, Vitaly Solodukha, Arkady Turtsevich

Generating Pipeline Integrated Circuits Using C2HDL Converter **139**
Denis Dubrov, Alexander Roshal

An Approach to Estimate the Error of Oscillator Time-Domain Analysis **143**
Vadim N. Biryukov, Alexandr M. Pilipenko

Sampling Theorem Applied to Data Interpolation Problem **147**
Gamlet S. Khanyan

Design Automation Tool to Generate EDIF and VHDL Descriptions of Circuit by Extraction of FPGA Configuration **151**
Cheremisinov D.I.

Object-Oriented Approach to Software Implementation of Virtual Laboratory Workshop **155**
Gubsky D.S., Zemlyakov V.V., Mamay I.V., Sinyavsky G.P.

Schematic Design of HF and UHF Op-Amp for SiGe Technology **159**
Sergei G. Krutchinsky, Evgeniy A. Zhebrun, Victor A. Svizev

Improvement of Common-Mode Rejection Ratio in Symmetrical Differential Stages with Dynamic Load **163**
Sergei G. Krutchinsky, G.A. Svizev, Alexey E. Titov

Testable Combinational Circuit Design Based on Free ZDD-implementation of Irredundant SOP of Boolean Function **167**
Ostanin S.

On the Problem of Selection of Code with Summation for Combinational Circuit Test Organization **171**
Dmitry Efanov, Valery Sapozhnikov, Vladimir Sapozhnikov, Anton Blyudov

A 6-bit CMOS Inverter Based Pseudo-Flash ADC with Low Power Consumption **177**
Morozov D.V., Pilipko M.M., Piatak I.M.

A List Decoding Algorithm for Practical Reed-Solomon codes **181**
Sergey Egorov

On Stability of Optimization Process for Analog Circuits **185**
Markina T., Zemliak A.

Analysis of Converters with Heterogeneous Three-Pole Chain Structure **189**
Zhanna Sukhinets, Artur Gulin

Delay Testable Sequential Circuit Designs **194**
Matrosova A., Mitrofanov E., Singh V.

Supervision in Airborne Systems with Antenna Array **198**
Klochko V.K., Nguyen Tr.T.

Coupled TCAD-SPICE Simulation of Parasitic BJT Effect on SOI CMOS SRAM SEU **201**
Petrosyants K.O., Kharitonov I.A., Popov D.A.

Digital Converter of Frequency Deviation Based on Three Frequency Generator **205**

Shakurskiy M.V., Shakurskiy V.K., Ivanov V.V.

Comparative Analysis of Coding Effectiveness in Telecommunication Systems with ARQ **209**
Anfalov K. V., Volovach V. I.

Nonlinear Filtering of Pseudonoise Signals Using High-Order Markov Chain Model **213**
Dmitriy Prozorov, Anton Chistyakov

Automated Measurement of Digital Video Cameras Exposure Time **217**
Budilov V.N., Volovach V.I., Shakurskiy M.V., Eliseeva S.V.

Hybrid Pareto-Evolutionary Algorithm for Solving Mathematical Models of High Dimensional Electronic Circuits (HPEA) **221**
Vadim Beglyarov, Andrey Bereza, Luis Blanco

Finite State Machine Synthesis for Evolutionary Hardware **225**
Andrey Bereza, Maksim Lyashov, Luis Blanco

Increasing Efficiency of Information Transmission with Interference Influence by the Use of Multi-parameter Adaptation **229**
Nechaev Y.B., Kashenko G.A., Plaksenko O.A.

Analysis of Ferromagnetic Structures Fast-Acting Under the Influence of External Magnetic Fields of Various Intensity **233**
Alexander Shein, Gennady Sinyavsky, Larissa Cherkesova, George Shalamov

Identification Discrete Fractional Order Linear Dynamic Systems with Errors-in-Variables **238**
Ivanov D.V.

Self-Calibration Method for Capacitor Mismatch Elimination **242**
Vazgen Melikyan, Harutyun Stepanyan, Ani Aleksanyan, Ani Harutyunyan, Armen Durgaryan

Low-Voltage Compatible Linear Voltage Ramp Generator for Zero-Crossing-Based Integrators **246**
Melikyan Vazgen Sh., Dingchyan Hayk H., Sahakyan Arthur S., Vardan Grigoryants P., Safaryan Karo H.

High Accuracy Equalization Method for Receiver Active Equalizer **250**
Melikyan Vazgen Sh., Sahakyan Arthur S., Safaryan Karo H., Dingchyan Hayk H.

Semiconductor Electronic Parts Testing Efficiency **254**
Martynov Oleg, Ogurtsov Alexander, Sashov Alexander

An Approach to Accelerated Life Tests of Electronic Components **258**
Koulibaba Andrey, Krasnov Mikhail, Prischepova Svetlana

High-level Test Program Generation Strategies for Processors **261**
Shima Hoseinzadeh, Mohammad Hashem Haghbayan

Fault Tolerance of the Distributed Structure of Object Controllers for Automation of Transport **265**
Sergey Rodzin, Lada Rodzina

Smart Road Infrastructure **269**
Artur Ziarmand

The Hardware Architecture and Device for Accurate Time Signal Processing **274**
Jiˇr´ı Dost´al, Vladim´ır Smotlacha

Method of Coding Bitmap Transformant to Improve Image Compression while Maintaining a Predetermined Quality Image to be Transmitted in Infocommunication Real Time Systems **277**
Krasnorutskyi A.A., Hahanova A.V., Demedetskiy A.O.

Algorithm for Automated Custom Network-on-Chip Topologies Design **281**
Bykov S. O.

An Efficient Fault Diagnosis and Localization Algorithm for Successive-Approximation Analog to Digital Converters **284**
Melkumyan T., Harutyunyan G., Shoukourian S., Vardanian V., Zorian Y.

Application of Defect Injection Flow for Fault Validation in Memories **288**
Amirkhanyan K., Davtyan A., Harutyunyan G., Melkumyan T., Shoukourian S., Vardanian V., Zorian Y.

Self Compensating Low Noise Low Power PLL design **292**
Vazgen Melikyan, Armen Durgaryan, Ararat Khachatryan, Manukyan Hayk, Eduard Musaelyan

Implementation of Address-Based Data Sorting on Different FPGA Platforms **296**
Dmitri Mihhailov, Alexander Sudnitson, Valery Sklyarov, Iouliia Skliarova

Comparison of Model-Based Error Localization Algorithms for C Designs **300**
Urmas Repinski, Jaan Raik

Synthesis of Clock Trees for Sampled-Data Analog IC Blocks **304**
Bilgiday Yuce, Seyrani Korkmaz, Vahap Baris Esen, Fatih Temizkan, Cihan Tunc, Gokhan Guner, I. Faik Baskaya, Iskender Agi, Gunhan Dundar, H. Fatih Ugurdag

Experiences on the road from EDA Developer to Designer to Educator **308**
H. Fatih Ugurdag

Multi-Beam Constant Modulus Adaptive Arrays in Real-Valued Arithmetic **312**
Victor I. Djigan

Simulation of Total Dose Influence on Analog-Digital SOI/SOS CMOS Circuits with EKV-RAD macromodel **318**
Petrosyants K. O., Kharitonov I. A., Sambursky L. M., Bogatyrev V. N., Povarnitcyna Z. M., Drozdenko E. S.

Models for Embedded Repairing Logic Blocks **324**
Hahanov V.I., Litvinova E.I., Frolov A., Tiecoura Yves

Real-time Interconnection Network for Single-Chip Many-Core Computers **330**
Harald Richter

Invariant-Oriented Verification of HDL-Based Safety Critical Systems **334**
Kharchenko V., Konorev B., Sklyar V., Reva L.

A WSN Approach to Unmanned Aerial Surveillance of Traffic Anomalies:
Some Challenges and Potential Solutions **338**
David Afolabi, Ka Lok Man, Hai-Ning Liang, Eng Gee Lim, Zhun Shen, Chi-Un Lei, Tomas Krilavičius, Yue Yang, Lixin Cheng, Vladimir Hahanov, and Igor Yemelyanov

Synthesis of Qubit Models for Logic Circuits **342**
Wajeb Gharibi, Zaychenko S.A., Dahiri Farid, Hahanova Yu.V., Guz O.A., Ngene Christopher Umerah, Adiele Stanley

Theory of Optimal Nonlinear Filtering in Infocommunication's Problems **349**
Victor V. Panteleev

Verification of Specifications in the Language L with respect to Temporal
Properties Expressible by GR(1) Formulas **357**
Anatoly Chebotarev

Properties of code with summation for logical circuit test organization **361**
Anton Blyudov, Dmitry Efanov, Valery Sapozhnikov, Vladimir Sapozhnikov

Loop Nests Parallelization for Digital System Synthesis **365**
Alexander Chemeris, Julia Gorunova, Dmiry Lazorenko

Decreasing the Power Consumption of Content-Addressable Memory
in the Dataflow Parallel Computing System **369**
Levchenko N.N., Okunev A.S., Yakhontov D.E., Zmejev D.N.

Malfunctions Modeling of Converters and Homogeneous-chain Distributed Structure Devices **373**
Artur Gulin, Zhanna Sukhinets

On structure of quasi optimal algorithm of analogue circuit designing **377**
Zemliak A., Michua A., Markina T.

A Neuro-Fuzzy Edge Based Spectrum Sensing Processor for Cognitive Radios **381**
Mohammadreza Baharani, Mohammad Aliasgari, Mohammadreza {Najafi, Jamali}, Hamid Noori

Qubit Model for Solving the Coverage Problem **385**
Hahanov V.I., Litvinova E.I., Chumachenko S.V., Baghdadi Ammar Awni Abbas, Eshetie Abebech Mandefro

PDF testability of the circuits derived by special covering ROBDDs with gates **389**
Matrosova A., Nikolaeva E., Kudin D., Singh V.

Observability Calculation of State Variable Oriented to Robust PDFs and LOC or LOS Techniques **394**
Matrosova A., Ostanin S., Melnikov A., Singh V.

Engineering-Maintenance Methods of the Calculation Service Area Fixed BWA-paths **400**
Sergey I. Myshlyakov, Victor V. Panteleev

Analyses of two run march tests with address decimation for BIST procedure **406**
Ireneusz Mrozek, Svetlana V. Yarmolik

System-on-Chip FPGA-Based GNSS Receiver **410**
Alexander Fridman, Serguey Semenov

Artificial Neural Network for Software Quality Evaluation Based on the Metric Analysis **417**
Oksana Pomorova, Tetyana Hovorushchenko

Universal technique of the analysis of round-off noise in digital filters with arbitrary structure described by topological matrixes **421**
Vladislav A. Lesnikov, Alexander V. Chastikov, Tatiana V. Naumovich, Sergey V. Armishev

Hardware Reduction for Compositional Microprogram Control Unit Dedicated for CPLD Systems **425**
Barkalov A., Titarenko L., Smolinski L.

Conservative Finite-difference Scheme for the Problem of Laser Pulse Propagation in a Medium with Third-order Dispersion **431**
Vyacheslav A. Trofimov, Anton D. Denisov

Matrix Implementation of Moore FSM with Nonstandard Presentation of State Codes **435**
Titarenko L., Hebda O.

A low power 1.2GS/s 4-bit flash ADC in 0.18m CMOS **439**
Mohammad Chahardori, Mohammad Sharifkhani, Sirous Sadughi

Lower Bound of Error in AOA Based Passive Source Localization Using Single Moving Platform **443**
Hejazi F., Norouzi Y., Nayebi M.M.

A Design for Testability Technique for Quantum Reversible Circuits **447**
Joyati Mondal, Debesh K. Das, Dipak K. Kole, Hafizur Rahaman

Models for Quality Analysis of Computer Structures **451**
Murad Ali Abbas, Chumachenko S.V., Hahanova A.V., Gorobets A.A., Priymak A.

Expanding Wireless Bandwidth in a Power-Efficient Way: Developing a Viable mm-Wave Radio Technology **457**
Daniel Foty, Bruce Smith, Saurabh Sinha, Michael Schröter

Sampling Theorem for Finite Duration Signal in Limited Frequency Band **463**
Gamlet S. Khanyan

The Use of Natural Resources for Increasing a Checkability of the Digital Components in Safety-Critical Systems **467**
Drozd A., Kharchenko V., Antoshchuk S., Drozd J., Lobachev M., Sulima J.

New version of Automated Electro-Thermal Analysis in Mentor Graphics PCB Design System **473**
Petrosyants K.O., Kozynko P.A., Kharitonov I.A., Sidorov A.V., Chichkanov Y. N.

An Approach to Testing of Planar Integrated Antennas in Frequency Range of 5–7 GHz **477**
Aleksandr Timoshenko, Ksenia Lomovskaya, Victor Barinov, Andrey Tikhomirov

Optimal project solution decision making in telecommunication systems using multicriteria optimization methods **482**
Valery Bezruk, Alexander Bukhanko

Architecture of Built-In Self-Test and Recovery Memory Chips **487**
Andrienko V.A., Moamar Diaa, Ryabtsev V.G., Utkina T.Yu.

The methods of exclusion of variables in symbolic time models of linear periodically time-variable circuit **491**
Yuriy Shapovalov, Dariya Smal

Development of parameterized cell using Cadence Virtuoso **495**
Vadim Borisov

Simulation Methods of Diffusion Alloying Process by Means of Taurus TSUPREM-4 Programme **497**
Lagunovich N.L., Borzdov V.M.

Features of the Transfer of Information with Different Reliability in a Single Channel **499**
Alexander Bakhtin, Leonid Pertsev, Olga Timofeeva

A New Structure for Interconnect Offline Testing **502**
Somayeh Sadeghi-Kohan, Shahrzad Keshavarz, Farzaneh Zokaee, Farimah Farahmandi, Zainalabedin Navabi

Researching of Mathematical Models Based on Optimal Control Approaches for Congestion Control in Telecommunication Network **507**
Lemeshko A.V., Semenyaka M.V.

Scheduling Tests for 3D SoCs with Temperature Constraints **511**
Indira Rawat, Gupta M.K., Virendra Singh

MIMO Radar with Phase-coded waveforms **515**
Amirsadegh Roshanzamir, Bastani M. H.

BBN-based Approach For Assessment of Smart Grid And Nuclear Power Plant Interaction **519**
Eugene Brezhnev, Vyacheslav Kharchenko

The Evaluation of Statistical Characteristics of the Retransmission Meter Signal Frequency and Initial Phase on the Basis of VHDL-model **526**
Dmitry A. Velychko, Iegor I. Vdovychenko

A Research of Heuristic Optimization Approaches to the Test Set Compaction Procedure Based On a Decomposition Tree for Combinational Circuits **530**
Valentina Andreeva, Kirill A. Sorudeykin

Power Reduction of 7T Dual-Vt SRAM Cell Using Forward Body Biasing **536**
Sahba Sabetghadam Jahromi, Raziyeh Bounik

VLSI: An Investigation into Electromagnetic Signatures (EMS) for Non-Invasive Testing and Signal-integrity Verification **540**
Kadim HJ, Coulibaly L. M.

Secure Data over GSM based on Algebraic Codebooks **544**
Kazemi R., Nashtaali D., Boloursaz M., Behnia F.

Extracting Complete Set of Equations to Analyze VHDL-AMS Descriptions **548**
Arezoo Kamran, Vahid Janfaza, and Zainalabedin Navabi

A Data Modem for GSM Adaptive Multi Rate Voice Channel **552**
Boloursaz M., Hadavi A. H., Kazemi R., Behnia F.

Design of Nonvolatile Memory Based on Magnetic Tunnel Junction for Special Electronic Systems **556**
Aleksandr Kostrov, Vladislav Nelayev, Viktor Stempitsky, Anatoly Belous, Arkady Turtsevich

Cyber Security Lifecycle and Assessment Technique for FPGA-based I&C Systems **560**
Illiashenko Oleg, Kharchenko Vyacheslav, Kovalenko Andriy

FPGA Technologies in Medical Equipment: Electrical Impedance Tomography **565**
Perepelitsyn Artem, Shulga Dmitry

Synchronous Rectifiers Enable High Efficiency for Buck-Boost Converter **569**
Yurii Shynkarenko and Igor Klyuchnyk

Test Data Compression Strategy While Using Hybrid-BIST methodology **573**
Elmira Karimi, Mohammad Hashem Haghbayan and Mahmood Tabandeh

Self-Adaptive Mobile Wireless Hotspot Zones **578**
Yanovsky M., Kharchenko V., Gorbenko A.

Assertion Based Method of Functional Defects for Diagnosing and Testing Multimedia Devices **582**
Vladimir Hahanov, Karyna Mostova, Oleksandr Paschenko

Improved Scaling-Free CORDIC algorithm **587**
Leonid Moroz, Taras Mykytiv, Martyn Herasym

Coding Tangible Component of Transforms to Provide Accessibility and Integrity of Video Data **592**
Barannik V.V., Hahanova A.V., Krivonos V.N.

Internet of Things: A Practical Implementation based on a Wireless Sensor Network Approach **596**
Michele Mercaldi, Andrea D'Oria, Davide Murru, Hai-Ning Liang, Ka Lok Man, Eng Gee Lim, Vladimir Hahanov, Mischenko Alexander

Investigation of EM Wave Propagation of the Wireless Capsule in Human Body **600**
Eng Gee Lim, Zhao Wang, Jin Hui Chen, Tammam Tillo, Ka Lok Man

Transaction Level Model of Embedded Processor for Vector-Logical Analysis **604**
Irina V. Hahanova, Volodymyr Obrizan, Alexander Adamov, Dmitry Shcherbin

The Positional Structural-Weight Coding of the Binary View of Transformants **608**
Barannik V., Krasnoruckiy A., Hahanova A.

Models for SoC Infrastructure of Radio Frequency Identification with Code-Division Multiple **612**
Filippenko I.V., Hahanova I.V., Filippenko I.O, Maksimov M., Chugurov I.

Logi-Thermal Analysis of Digital Circuits Using Mixed-Signal Simulator Questa ADMS **615**
Petrosyants K.O., Rjabov N.I.

RTL IP Abstraction into Optimized Embedded Software **619**
Bombieri N., Forrini D., Fummi F., Laurenzi M., Vinco S.

Keynotes Speeches and Invited Reports

Estimation of Radio Wave Frequency Shift and Phase Incursion on the Basis of FPGA in the Retransmission Meter **624**
Vdovychenko, I. I., Velychko D.A.

Hybrid History-Based Test Overlapping to Reduce Test Application Time **627**
Janfaza V., Forouzandeh R., Behnam P., Najafi M.

Compositional Microprogram Control Unit With Operational Automaton of Transitions **631**
Barkalov A., Babakov R., Titarenko L.

AUTHORS INDEX