

2014 East-West Design & Test Symposium

(EWDTS 2014)

**Kiev, Ukraine
26 – 29 September 2014**



**IEEE Catalog Number: CFP14DTW-POD
ISBN: 978-1-4799-7631-7**

CONTENTS

Extending Fault Periodicity Table for Testing Faults in Memories under 20nm	1
Harutyunyan G., Shoukourian S., Vardanian V., Zorian Y.	
Modified Fast PCA Algorithm on GPU Architecture	5
Vazgen Melikyan, Hasmik Osipyan	
Design of Low-Ripple Multi-Topology Step-Down Switched Capacitor Power Converter with Adaptive Control System	9
Vazgen Melikyan, Vache Galstyan	
Resistance Calibration Method Without External Precision Elements	13
Vazgen Melikyan, Arthur Sahakyan, Mikayel Piloyan	
An Efficient Signature Loading Mechanism for Memory Repair	17
Vrezh Sargsyan	
Dual Interpolating Counter Architecture for Atomic Clock Comparison	21
Jiřrř Dostřal, Vladimřr Smotlacha	
Communication with Smart Transformers in Rural Settings	25
Cornel Verster, Males Tomlinson, Johan Beukes	
The Concept of Green Cloud Infrastructure Based on Distributed Computing and Hardware Accelerator within FPGA as a Service	30
Yanovskaya O., Yanovsky M., Kharchenko V.	
Cyber Physical System – Smart Cloud Traffic Control	34
Vladimir Hahanov, Wajeb Gharibi, Abramova L.S., Svetlana Chumachenko, Eugenia Litvinova, Anna Hahanova, Vladimir Rustinov, Vladimir Miz, Aleksey Zhalilo, Artur Ziarmand	
Cyber Physical Social Systems – Future of Ukraine	52
Vladimir Hahanov, Wajeb Gharibi, Kudin A.P., Ivan Hahanov, Ngene Cristopher (Nigeria), Tiekura Yeve (Côte d'Ivoire), Daria Krulevska, Anastasya Yerchenko, Alexander Mishchenko, Dmitry Shcherbin, Aleksey Priymak	
The Cooperative Human-Machine Interfaces for Cloud-Based Advanced Driver Assistance Systems: Dynamic Analysis and Assurance of Vehicle Safety	67
Vyacheslav Kharchenko, Alexandr Orehov, Eugene Brezhnev, Anastasiya Orehova, Viacheslav Manulik	
Multichannel Fast Affine Projection Algorithm with Gradient Adaptive Step-Size and Fast Computation of Adaptive Filter Output Signal	72
Victor I. Djigan	
Qubit Method for Diagnosing Digital Systems	78
Baghdadi Ammar Awni Abbas (Baghdad University), Farid Dahiri, Anastasiya Hahanova	
Method for Diagnosing SoC HDL-code	82
Vladimir Hahanov, Sergey Zaychenko, Valeria Varchenko	

Smart traffic light in terms of the Cognitive road traffic management system (CTMS) based on the Internet of Things	88
Volodymyr Miz, Vladimir Hahanov	
Partitioning of ECE Schemes Components Based on Modified Graph Coloring Algorithm	93
Kureichik V.V., Kureichik VI.VI., Zaruba D.V.	
Neighborhood Research Approach in Swarm Intelligence for Solving the Optimization Problems	97
Kuliev E.V., Dukkardt A.N., Kureychik V.V., Legebokov A.A.	
On the Synthesis of Unidirectional Combinational Circuits Detecting All Single Faults	101
Valery Sapozhnikov, Vladimir Sapozhnikov, Dmitry Efanov, Anton Blyudov	
Combinational Circuits Checking on the Base of Sum Codes with One Weighted Data Bit	109
Valery Sapozhnikov, Vladimir Sapozhnikov, Dmitry Efanov, Dmitry Nikitin	
Control Vector Structure for Circuit Optimization	118
Zemliak A., Reyes F., Markina T.	
Theory of Bionic Optimization and its Application to Evolutionary Synthesis of Digital Devices	122
Sergey Rodzin, Lada Rodzina	
Broken Bar Fault Diagnosis for Induction Machines under Load Variation Condition using Discrete Wavelet Transform	127
Pu Shi, Zheng Chen, Yuriy Vagapov, Anastasia Davydova, Sergey Lupin	
Modeling of MOSFETs Parameters and Volt-Ampere Characteristics in a Wide Temperature Range for Low Noise Amplifiers Design	131
Alexandr M. Pilipenko, Vadim N. Biryukov	
Active-Mode Leakage Power Optimization Using State-Preserving Techniques	135
Andrey V. Korshunov, Pavel S. Volobuev	
Partially Programmable Circuit Design	139
Matrosova A., Ostanin S., Kirienko I., Singh V.	
Combinational Part Structure Simplification of Fully delay Testable Sequential Circuit	143
Matrosova A., Mitrofanov E., Roumjantseva E.	
Decomposition Tree - based Compaction Procedure with Iteration Steps for Interconversional Layouts of Tasks	148
Valentina Andreeva, Kirill A. Sorudeykin	
Combinational Circuits without False Paths	154
Matrosova A., Kudin D., Nikolaeva E.	
The Levels of Target Resources Development in Computer Systems	160
Drozd J., Drozd A., Maevsky D., Shapa L.	
Deriving complete finite tests based on state machines	165
Igor Burdonov, Alexander Kossatchev, Nina Yevtushenko	
Microwave Selective Amplifiers with Paraphase Output	169
Sergey G. Krutchinsky, Petr S. Budyakov, Nikolay N. Prokopenko, Vladislav Ya. Yugai	

The Multichannel High-Frequency Compensation of the Analog Sections of Flash ADCs with the Differential Input at the Cascade Connection of the Reference Resistors	173
Nikolay N. Prokopenko, Alexander I. Serebryakov, Vladislav Ya. Yugai	
Selftest ADCs for Smart Sensors	176
Sergei G. Krutchinsky, Evgeniy A. Zhebrun	
Manufacturing Scheduling Problem Based on Fuzzy Genetic Algorithm	180
Leonid Gladkov, Nadezhda Gladkova, Sergey Leiba	
Assessment of Survivability of Complex Control Systems using Simulation Methods	184
Anastasia Davydova, Sergey Lupin, Yuriy Vagapov	
The Impact of Sensors' Implementation on Lift Control System	188
Sergey Lupin, Kyaw Kyaw Lin, Anastasia Davydova, Yuriy Vagapov	
Threshold Method of Measurement of Extended Objects Speed of Radio Engineering Devices of Short-Range Detection	191
Artyushenko V. M., Volovach V. I.	
The Formulation of Criteria of BIBO Stability of 3rd-order IIR Digital Filters in Space of Coefficients of a Denominator of Transfer Function	195
Lesnikov V., Naumovich T., Chastikov A.	
Qubit Modeling Digital Systems	198
Hahanova Irina, Emelyanov Igor, Tamer Bani Amer	
Repair of Combinational Units	201
Yulia Hahanova, Armen Bayadzhan	
Malicious Hardware: Characteristics, Classification and Formal Models	204
Valeriy Gorbachov	
Self-Testing Checker Design for Incomplete m-out-of-n Codes	208
Butorina N.	
Profiling of MES software requirements for the pharmaceutical enterprise	212
Fedoseeva A., Kharchenko V.	
A New Technique for Layout Based Functional Testing of Modules in Digital Microfluidic Biochips	216
Pranab Roy, Samadrita Bhattacharya, Hafizur Rahaman, Parthasarathi Dasgupta	
Discovering New Indicators for Botnet Traffic Detection	222
Alexander Adamov, Vladimir Hahanov, Anders Carlsson	
Expert evaluation model of the computer system diagnostic features	227
Krivoulya G., Shkil A., Kucherenko D., Lipchansky A., Sheremet Ye.	
Construction of Adaptive Artificial Boundary Conditions Using the Invariant Ratios for Schrödinger Equation	231
Vyacheslav A. Trofimov, Evgeny M. Trykin	
Comparative Analysis of Interference Immunity of Adaptive Information Transmission System with Hybrid Spectrum Spreading and Nonadaptive Systems	235
Nechaev Y.B., Kashenko G.A., Plaksenko O.A.	

On Fuzzy Expert System Development Using Computer-Aided Software Engineering Tools	239
Polkovnikova N. A., Kureichik V. M.	
Set Covering on the Basis of the ant Algorithm	243
Lebedev B.K., Lebedev O.B., Lebedeva E.M.	
Two-channel real-time steganographic system	247
Shakurskiy M.V., Shakurskiy V.K., Volovach V.I.	
Mobile Health Applications to Support Diabetic Patient and Doctor	250
Petrenko A.I.	
Temperature Aware Test Scheduling by Modified Floorplanning	256
Indira Rawat, M.K. Gupta, Virendra Singh	
The Linear Logic Synthesis of k-Valued Digital Structures in the Analogous Circuitry Basis	260
Nikolay N. Prokopenko, Nikolay I. Chernov, Vladislav Ya. Yugai	
The Precision Voltage References for the Radiation-Hardened Bi-FET Technological Process	264
Evgeniy I. Starchenko, Nikolay N. Prokopenko, Vladislav Ya. Yugai	
Squaring in Reversible Logic using Iterative Structure	268
Arindam Banerjee and Debesh Kumar Das	
Adaptive Artificial Boundary Conditions for Schrödinger Equation Taking Into Account the First Order Dispersion of Laser Pulse and Diffraction of Laser Beam	272
Vyacheslav A. Trofimov, Anton D. Denisov	
Video Decompression Technology in Information and Communication Technologies	276
Ryabukha Yu., Krivonos Vladimir, Hahanova Anna	
Hybrid History-Based Test Overlapping to Reduce Test Application Time	279
Vahid Janfaza, Bahjat Forouzandeh, Payman Behnam, and Mohammadreza Najafi	
A Mathematical Model for Estimating Acceptable Ratio of Test Pat	283
Vahid Janfaza, Paniz Foroutan, Bahjat Forouzandeh, and M. H. Haghbayan	
Method of Free C++ Code Migration Between SoC Level Tests and Standalone IP-Core UVM Environments	287
Fedor Putrya	
Efficient Calculation of Cyclic Convolution by Means of Fast Fourier Transform in a Finite Field	291
V.M. Amerbaev, R. A. Solovyev, A.L. Stempkovskiy, D.V. Telpukhov	
Optimizing Test Time for Core-Based 3-D Integrated Circuits by a Technique of Bi-partitioning	295
Manjari Pradhan, Debesh K. Das, Chandan Giri, Hafizur Rahaman	
Basic Concept of Linear Synthesis of Multi-Valued Digital Structures in Linear Spaces	299
N.I. Chernov, V.Ya. Yugai, N.N. Prokopenko, N.V. Butyrlagin	
The Correction Circuits for the Broadband Resistive Voltage Dividers with the Capacitive Load	303
Nikolay N. Prokopenko, Petr S. Budyakov, Nikolay V. Butyrlagin	
The Synthesis of the Correction Circuit of the High Speed Sensors of the Physical Quantities and Current-Voltage Converters with the Parasitic Capacitance	307
N.N. Prokopenko, A.R. Gaiduk, P.S. Budyakov, N.V. Butyrlagin	

Using Java Optimized Processor as an Intellectual Property core beside a RISC processor in FPGA	311
Mohammad Erfan Khazaei, Shima Hoseinzadeh	
The Modeling of Electromagnetic Fields Intensity in Urban Development Condition	317
Anishin M.M., Zargano G. F., Zemlyakov V.V., Hondu A.A.	
Testing of Transport System Management Strategy	321
Sergey Lupin, Than Shein, Kyaw Kyaw Lin, Anastasia Davydova	
The Input Analog Section of the Ultrafast ADCs	325
Prokopenko N.N., Serebryakov A.I., Butyrlagin N.V., Pakhomov I.V.,	
Using Metamodel of Object System for Domain-Driven Design the Database Structure	328
Pavel P. Oleynik	
Representation of solutions in genetic VLSI placement algorithms	332
D.U. Zaporozhets, D.V. Zaruba, V.V. Kureichik	
Analysis and Simulation of Temperature-Current Rise in Modern PCB Traces	336
Konstantin Petrosyants, Artur Kortunov, Igor Kharitonov, Anton Popov, Natalya Gomanilova, Nikita Rjabov	
SPICE Model Parameters Extraction Taking into Account the Ionizing Radiation Effects	340
Konstantin Petrosyants, Maxim Kozhukhov	