ABSTRACTS

Radioelektronika i informatika. 2005. № 3.

UDC 621.396.96

Monopulse direction finder with built-in control and compensation of the nonidentity of the receivers gain-phase characteristics. / A.N.Zajchenko, V.I.Tolkachev, Y.A.Kolesnikov, A.P.Vereshchak // Radioelektronika i informatika. 2005. № 3. P. 5-7.

This paper suggests a method of input of a monitoring signal, a method of digital signal processing and a procedure of calibration gain and phase characteristics of paths of a monopulse direction finder. Issues of practical realization are also considered.

Ref.: 10 items.

UDC 537.862

Fractal dimension of the attractor of nonlinear dynamical system with delayed feedback and piecewise linear map / O.V. Zemlyaniy, K.A. Lukin // Radioelektronika i informatika. 2005. № 3. P. 8-15.

The model of nonlinear dynamical system implemented as closed loop of nonlinear element and delay line is investigated by means of numerical simulation. It has been shown the behaviour of such system is described by nonlinear differential-difference equation. The estimation of attractor fractal dimension is presented for the case of “tent-map” type nonlinearity. Interrelation between strange attractor dimension and inherent times of the system has been established.

Fig. 9. Ref.: 26 items.

UDC 539.38

The problem of stationary vibrations of an elastic double-layer space with a cavity of elliptic cylinder form /V.O.Afanasyev, G.V. Sova, N.P.Klimova, Y.V.Nataluha // Radioelektronika i informatika. 2005. № 3. P. 15-17.

This paper deals with a problem of stationary vibrations of an elastic double-layer space with a cavity of elliptic cylinder form. The formulae of the re-expansion of the solutions of the Hermholz equation in the Cartesian and elliptic coordinates are used. The problem is reduced to completely continuous form system of algebraic equations. Generalizations of initial boundary value problem are discussed.

Ref.: 8 items.

UDC 517.958:536.71

Mathematical models and numerical simulation of **diffusion-reaction problems of brain-chemistry** / A.I. Oleinick, C.A. Amatore, I.B. Svir // Radioelektronika i informatika. 2005. № 3. P. 18-22.

Two mathematical models and the conformal mapping approach for the numerical simulation of diffusion-reaction processes occurring in living rat’s brain slice are presented. An optimization procedure was applied for the determination of biochemical parameters and the neuron activity function.

Fig. 9. Ref.: 10 items.

UDC 517.958:536.71

Calculation of ECL emission intensity measured using confocal microscope / A.I. Oleinick, A.G. Drogovozov, C.A. Amatore, I.B. Svir // Radioelektronika i informatika. 2005. № 3. P. 23-28.

A new algorithm for calculating the intensity of ECL emission measured using a confocal microscope in a system with two band microelectrodes is suggested. The algorithm takes into account finite size of the focal area of the microscope where light intensity is measured. Concentration fields of all reacting species are numerically simulated using the conformal mapping approach.

Fig. 5. Ref.: 14 items.

UDC 517.958:541.14

Analysis of new methods for the numerical solution of stiff ODEs / V.N. Shulyk, A.V. Klymenko, I.B. Svir // Radioelektronika i informatika. 2005. № 3. P. 28-35.

The mathematical model of the Briggs-Rauscher reaction is solved using two novel numerical methods for stiff ODE systems that have been amended with automatic integration step adjustment algorithms. The simulation results have been compared to those obtained by the well-known Gear method. The efficiency of the “Almost Runge-Kutta method is comparable to that of the Gear method, however a more robust step selection strategy is required. The method of Aluffi-Pentini is too computationally expensive and therefore should not be used in practice.

Tab. 2. Fig. 3. Ref.: 15 items.

UDC 621.385.6

Estimation of possibility of increase of output characteristics level of the spatial harmonic magnetrons / E. V. Fursova, S. V. Sosnytskiy, D. M. Vavriv // Radioelektronika i informatika. 2005. № 3. P. 36-40.

The theoretical research of influence of periodic distortions, caused by change of the anode block resonators depth according to the periodic law, on the basic output characteristics of magnetrons oscillating on 8-mm wavelength is carried out on the basis of the self-consistent simulation of the spatial-harmonic magnetron which takes into account nonlinear electron-wave interaction, spatial charge effects, and secondary emission from the cold cathode. It is shown, that effect of increase of the output characteristics level of such magnetron, which was predicted by calculations of its cold characteristics, does not prove to be true in the case of modeling with use of the self-consistent model.

Tab. 3. Fig. 4. Ref.: 7 items.

UDC 621.391.822

Flicker-noise diagnostic of internal structure of elements of electronics / Z.A. Kolodiy // Radioelektronika i informatika. 2005. № 3. P. 40-42.

Using the results of computer simulation of random motion of fundamental particles and comparing them with known experimental results is made a conclusion, that the flicker noise is of the same nature, as the thermal noise, and form of a spectrum in the range of low frequencies (rise of spectral components at $f > 0$) depends on an internal structure of elements. For a gated in trial-and-error ratio for a spectral concentration of noise by a determinal factor, that influences on the form of a spectrum in the range of low frequencies, there is a time of relaxation ф. The results of computer simulation demonstrate, that the elements with the ordered internal structure have the longer time of relaxation, than the elements with random structure, and consequently the level of flicker noises in the first case is less than in second.

Fig. 2. Ref.: 7 items.

UDC 621.375.8.0.38.825.4+681.7.069.24

Gain spectra computation for semiconductor structures with single quantum well / M.V. Klimenko, O.V. Shulika, I.M. Safonov, I.A. Sukhoivanov // Radioelektronika i informatika. 2005. № 3. P. 43-46.

New approach for the band structure computation of the single quantum well structure is proposed. It is based on the Galerkin method as in many papers. Novelty is contained in basis functions that have been computed with transfer matrix method.

Fig. 6 Ref.: 6 items.

UDC 621.396

Synthesis of filters for digital transmission bandlimited systems // A.A. Astrakhantsev, A.V. Omelchenko, I.N. Presnyakov // Radioelektronika i informatika. 2005. № 3. P. 47-50.

The questions of synthesis of the characteristics of the filter with a top speed of decrease of power of side lobes of a pulse response are considered at preset width of a spectrum and zerolevel of an intersymbol interference.

Tab.2. Fig.2. Ref.: 2 items.

UDC 621.391

Probability-temporary tensor model of the single messages (packets) transmission in telecommunication networks with preset metrics of QoS / A.V. Lemeshko, A.A. Kravchuk, V.N. Rudenko // Radioelektronika i informatika. 2005. № 3. P. 50-55.

The tensor representation of mathematical model of a telecommunication network has allowed to formalize in analytical sort of a condition of guaranteed transmission of the single messages (packets) with preset values of probability-temporary metrics of QoS.

Fig. 1. Ref.: 7 items.

UDC 681.7.069.24:681.7.064.45

Properties of reflective distributed Bragg reflectors with trapped oxide / A.A. Kovbasa, I.O. Zinkovska, V.V. Lysak, A.V. Shulika, I.A. Sukhoivanov // Radioelektronika i informatika. 2005. № 3. P. 55-61.

The analysis of optical properties multilayer of mirrors of oxide-apertured vertical cavity surface emitting lasers will be carried out. The spectral dependences of reflectance and phase, reflection delay and dispersion Bragg mirror with oxide layer and without it are received. The mechanisms of influence of trapped oxide in distributed Bragg mirror on a reflectance spectrum, phase penetration depth and electromagnetic field in the lasers cavity are considered.

Fig. 10. Ref.: 17 items.

UDC 519.81

Technique of verification of reliability and accuracy of models of definition of preferences of decision maker/ K. E. Petrov, L. V. Kolesnik // Radioelektronika i informatika. 2005. № 3. P. 62-69.

The common approach to check of adequacy of model of definition of preferences of the persons accepting the decisions is offered. As an example of realization of the given approach results of computing experiment of definition of dot values of factors of relative importance of individual characteristics of alternatives are resulted on the basis of the interval information and an establishment of the relation of the order on the set of alternatives.

Tab. 7. Ref.: 12 items.

UDC 519.85

Classes of composition images of combinatorial sets in mathematical models of packing and cutting problems/I. Grebennik // Radioelektronika i informatika. 2005. № 3. P. 69-73.

Combinatorial sets of complex structure to be composition images of combinatorial sets (k-images) are classified. The classes of k-images of combinatorial sets based on permutations, arrangements, combinations and n-tupples are introduced. Properties of the class of k-images set – permutations composition under mapping to Euclidean space are investigated.

Tab. 1. Ref.: 6 items.

UDC 681.3 + 519.65

Polygonal Approximation of Star-shaped bounds / N.S. Lesnaya, A.S. Smelyakova // Radioelektronika i Informatika. 2005. № 3. P. 73-82.

A method is proposed for polygonal approximation of star-shaped bounds with a specified accuracy being defined by variance or Chebyshev's metric, that is based on selection of interpolation poles, which reflect the peculiarities of application problems relative to extremities, and construction of 4-order-based polygonal splines between these poles. Linear time efficiency estimates are obtained for the proposed method.

Fig. 4. Ref.: 12 items.

UDC 681.5

Parametric optimization of stochastically disturbed systems and its connections on the Petri nets basis / S.A. Kachur // Radioelektronika i informatika. 2005. № 3. P.83-87.

Universal adaptive algorithm of optimum control by parameters on the Petri nets basis for no terminal and terminal control on the square-law criterion is offered. The algorithm allows to synthesis control action on the variable range for complex systems, than function under large prior uncertainty conditions. Scheme of optimum adaptive automatic control system in given.

Fig. 5. Ref. 10.

UDC 519.713:681.326

Contactless Mixed-Signal In-Circuit Testing / Ami Gorodetsky // Radioelektronika i informatika. 2005. № 3. P. 88-95.

The paper describes a new technique based on the 1149.1 and 1149.4 test access standards for contactless in-circuit testing of analog and digital nodes in mixed-signal circuit boards. It also describes a new mixed-signal IC core infrastructure for testing logic core and embedded memories via boundary-scan circuitry and with the minimum pin-count access. A method of in-circuit passive component (and component clusters) testing instead of analog measurement and value calculation is also described.

Fig. 6. Ref.: 11 items.

UDC 681.324.01

Synchronization process problems at the asynchronous parallel finite state machines / A.V. Nemchenko // Radioelectronika i informatika // Radioelektronika i informatika. 2005. № 3. P. 95-99.

The mathematical model of the asynchronous parallel digital automaton which allows to describe and to synthesize an automaton with parallel algorithm surveyed. The problems of asynchronous processes interacting are parsed. The guidelines on synchronization of parallel processes are given.

Fig. 10. Ref.: 3 items.

UDC 519.713

Methods of estimation of IP-telephony quality /V.S. Gema, V.A. Chikina // Radioelektronika i informatika. 2005. № 3. P. 99-103.

The analysis of analytical and statistical methods of an estimation of voice quality in VOIP-networks is offered in the article, advantages and disadvantages of each of them are specified. On the basis of a comparative analysis of subjective and automatic methods of service quality estimation its practical realization is offered. A general classification of estimation methods of voice transfer quality by means of IP-telephony in comparison with already available is presented.

Tab. 5. Fig. 1. Ref.: 5 items.

UDC 519.713:681.326

Synthesis of combinational circuits in basis of polynom,s forms / M.A. Bereghna, M.G. Rigikova, D.A. Tatarenko // Radioelektronika i informatika. 2005. № 3. P. 103-109.

This paper presents a design method of easily tested networks based upon fixed polarity Reed-Muller canonical (RMS) expression of the arbitrary switching function. It have been shown that the selection of this approach allows to reduce a number of product terms of a given switching function. This correspondence presents the method and algorithm of selecting the fixed polarity RMS expression of the switching function with minimal product terms possessing the smallest test set.

Tab. 4. Fig. 2. Ref.: 9 items.

UDC 519.713.4

Synthesis of conditional tests for not determined networks

/ A.F. Petrenko, M.V. Vetrova, N.V. Evtushenko// Radioelektronika i informatika. 2005. № 3. P. 109-112.

The description of the test as the automatic device is offered, conditional and unconditional tests for not determined automatic device are defined and efficiency of conditional tests is illustrated at check, whether the behaviour of the checked automatic device contains in behaviour of the reference not determined automatic device.

Fig.3. Ref.: 7 items.

UDC 519.713:681.326

Heuristic method of testability analysis of digital circuits for deterministic ATPG / E.N. Kulak, M.A. Kaminskaya,Wade Ghribi, Hassan Ktiaman // Radioelektronika i informatika. 2005. № 3. P. 113-118.

It is proposed method of testability analysis of digital circuits for deterministic ATPG. This method is more suitable in comparison with known classical methods. It is oriented on combinational and sequential circuits and based on topological analysis on the gate level. It is offered the strategy of circuits' modification for minimize number of untestable faults.

Tab.2. Fig.7. Ref.: 22 items.

UDK 681.518

Method of determination active access policies in computer network / Sayenko V.I., Golubev A.S. // Radioelektronika i informatika. 2005. № 3. P.119-124.

The problem of the access control has been solved by definition of a working rule value of access for resource request by access object. The active access policy has been set as all possible decisions of the access control of concerning set of resources and users is entered.

Tab. 1. Fig. 1. Ref.: 5 items.

UDK 519.7

An orthogonalization of conjuncterms theoretical-set method of Boolean function / B.Ye. Rytsar // Radioelektronika i informatika. 2005. № 3. P. 125-127.

Differential feature of proposed set-theory method Boolean function conjuncterms (conjunctive terms) orthogonalization is such a fact that it guarantees optimal result by complexity criteria (minimum literals of orthogonalized conjuncterms) and for it realization are used simple operations which are easy realized on computer. In the base of considered algorithm lies difference operation of two numerical conjuncterms (as intersection of their pseudo-tripartite values, one of which is direct and second – inverse), which provides minimal ranks of obtained conjuncterms.

Tab. 1. Fig. 1. Ref.: 7 items.

UDC 621.391.96

The new approaches to the parametrical recognition algorithm synthesis / B.O. Kapustiy, B.P. Rusyn, V.A. Tayanov // Radioelektronika i informatika. 2005. № 3. P. 128-134.

In this paper the various approaches to the recognition algorithms synthesis task are considered. The whole approaches can be divided into two groups. The first approaches group uses the differential recognition reliability indices. The second approaches group is based on sequential analysis (the Wald test). In differential approach bounds it is established that just such an approach unlike the classical statistical approach can be used when we work with small precedent samples for recognition algorithm synthesis. We prove the theorem about identity of the differential probability of correct recognition average value and total probability of algorithm correct recognition when increasing the sample size. In sequential analysis approach bounds it is defined the number of cluster patterns that provide the sufficient information description of input patterns of recognition system. The sequential analysis has been applied when establishing the optimal by different parameters the sample of KLT spectral components for recognition process realization.

Fig. 11. Ref.: 10 items.

UDC 621.396: 510.62

Intellectual system of low-sized air objects detection / V.V.Zhirnov, S.V.Solonskaya // Radioelektronika i informatika. 2005. № 3. P. 134-138.

The intellectual adaptive system of low-sized air objects detection on a background radar clutter from the ground level environment based on overlapping of the power and spectral analysis with adaptation of detection parameters to statistics and to averaged interference spectrum in a vicinity of an analyzed resolution cell is offered.

Fig. 3. Ref.: 4 items.

UDC 330.45:330.47

The analysis of technology of databases access in multi-user information systems / A.M. Kobylin, E.Y. Markova // Radioelektronika i informatika. 2005. № 3. P. 138-142.

The Universal Data Access Microsoft ADO and useful library ADO such as ADO Extension for DDL and Security (ADOX) Jet and Replication Objects (JRO) and ADO Multidimensional (ADO MD)) are considered.

Tab. 1. Fig. 4. Ref.: 6 items.

UDC 517.95

Lagrange and Hermite interlocation formulas for loci the points / R.A. Uvarov, T.I. Sheyko // Radioelektronika i informatika. 2005. № 3. C. 142-146.

In reconstructing the function of two variables, when nodes are loci the points, the Lagrange and Hermite interlocation formulas were examined. For availability of smoothing functionals with known and unknown values of partial derivatives of function in nodes the Hermite interloaction formula was modified. The functionals modelled “soap bubble” tension and plate flexure were applied for smoothing the initial approximations.

Fig. 6. Ref.: 6 items.

UDC 330.131.5:004.735.5

Method of estimation of efficiency the internet representative offices / S.V. Grishko, K. E. Novitskaya // Radioelektronika i informatika. 2005. № 3. P. 146-151.

Two variants of the commercial use of site are considered: how commodity and how assets of enterprise. A method allowing estimating economic efficiency of exploitation of site in economic activity is developed. Practical recommendations are offered on the costs accounting and determination of effects from the use of site.

Ref.: 6 items.

UDC 618.514.01:517.977.5

The solution of dynamic synthesis task / A. E. Radievski // Radioelektronika i informatika. 2005. № 3. P. 151-153.

Within the procedure of analytical construction of opti-mal regulators we consider the solution of dynamic synt-hesis task. From the whole solution under consideration: existence and single solve, existence continuos continua-tion to the saturation domain and the principle of realiza-tion the synthesis algorithm of control.
Ref.: 11 items.