ABSTRACTS AND REFERENCES

Multicriterion optimization of the control systems telecommunication networks (PP. 5-11)

Horokhovskyi Ye. P., Zinenko Yu. M., Kriychkova L. P., Borysenko I. I.

Management system by telecommunications networks is intended for providing of the optimal use of all present equipment of network in any situations for providing of quality of maintenance of users. Important is a process of optimization of both control system and process of her planning, that is why the task of optimal synthesis of the systems appears with a management that provides necessary behavior of the system and satisfies to the criteria of management quality. The paper discusses the method of multicriterion optimization, allowing to carry out the synthesis of the control systems telecommunication networks. Vector synthesis task is to ensure that the set of admissible points strictly select a point (system) with the best value quality parameters vector K. It is assumed that the term "best vector K" specified based on the conditions of the problem.

Keywords: telecommunication network, control system, multicriterion optimization, vector synthesis

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Formation and study concatenated telecommunication system using turbo coding (PP. 12-23)

Boiko J. M.

The paper represents the principles of channel coding in telecommunication systems based on concatenated codes. The scheme of decoder interleaving bits of data and scaling to concatenated code components of the telecommunication system of channel coding is proposed and investigated. The construction principles code word *N*-dimensional structures turbo codes are described. There are proposed the scheme and algorithm block signal processing circuits taking into account the clock and phase synchronization. The simulation scheme for the study of principles-based signalling concatenated codes in telecommunication systems is developed. The results of the simulation study scheme channel information transmission in telecommunication systems with concatenated encoding when determining the energy gain are received.

Keywords: channel coding, turbo code, synchronization, signal-code construction, telecommunication system, concatenated code

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Testing timeseries ring-coupled map generated by on FPGA (C. 24-29)

Krulikovskyi O. V., Haliuk S. D., Politanskyi L. F.

In this paper we investigate four-dimensional chaotic ring-coupled map using FPGA. For implementation on FPGA was used Q4.28 fixed point arithmetic. Through analysis of balance bits defined which range of bits, that can use for creation pseudorandom sequences. Proposed and implemented method of generating pseudorandom sequences based on shift registers and XOR. The obtained sequences passed NIST statistical tests.

*Keywords***:** ring-coupled map, FPGA, PRNG, chaotic ciphers, NIST, pseudorandom sequence

Air drone control in terms of jamming support (PP. 30-35)

Fesenko A. D. Radzivilov G. D.

An effective control algorithm for an unmanned aerial vehicle in terms of electronic countermeasures is developed. The overall structure of the organizational-technical system of an unmanned aircraft, which is based on three main levels, is given. The basic methods of operating the unmanned aircraft are defined. A scheme of work stations, electronic warfare unmanned aerial vehicle is developed. It is defined areas of improvement of the level of control of the aircraft in conditions of active electronic countermeasures. Given the principle of the path calculation, provided electronic countermeasures and the likelihood of the unmanned aerial vehicle in the specified area. It is noted that a direct factor of influence on the management of unmanned aircraft is the correlation function of the electronic countermeasures and the model of the navigation signal in the range unmanned aerial vehicle. Feature of the given algorithm is the possibility of introducing variable parameters of electronic countermeasures, if they are fully a priori certainty.

Keywords: unmanned aerial vehicle, unmanned aircraft, electronic counter, the zone of the antiterrorist operation, navigation means

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Information on the actions forming the necessary awareness counterparty exposure (PP. 36-40).

Kubiavka M. B.

The aim of the study is to create scientific-based methods of management of information influence which could be used in the management information support in the preparation and conduct of military actions. The main idea of this research is to substantiate and formally submit such scientific and methodological tools of management influence that will provide significant improvement of ways of preparation and conduct of operation information influence on the enemy, implementation of countermeasures will be most informative and clear, simple, effective and minimally costly. Therefore, there is need to consider question of the management information is not from the point of maximum exposure informing contractors and from the standpoint of information necessary action on them. It should take into account not only the means of obtaining information, but also the specific methods of information-oriented information to enemy action.

Keywords: information technology management impacts; information operations; theory of non-coercive interaction

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The research of the flow contrlol methods in the NGN for TCP/IP (PP. 41-46)

Varfolomeieva O. H., Moroz O. O.

The article analyses the architectural features of telecommunication networks in the transition to the global information infrastructure. The basic protocol of the next generation networks are protocols that are currently used in the network NGN - protocol stack TCP / IP. The research paper examines methods of flow control in NGN networks based on protocol TCP. The problems associated with effective control are being considered using distributed control mechanisms protocol TCP. The basic requirements for control of flow protocol TCP / IP, the analysis of the details of the mechanisms, methods and algorithm flow control in NGN. Identifies common approaches that are employed in these mechanisms, as well as the main advantages of flow control protocol TCP networks NGN.

Keywords: telecommunications network, management system, TCP, AIMD, additive increase, multiplicative decrease, slow start, flow control, congestion

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The methodology for calculating the energy range of detection of radar targets (47-51)

Azarenko O. V., Honcharenko Yu. Y u., Konovalenko N. V., Lazarenko S. V.

This paper analyzes the basic tenets of the theory of electromagnetic wave propagation and reflective properties of radar targets. The inequality-range radar is considered . One embodiment of a graphical solution of the inequality-range radar is illustrated. On the basis of the solution it is proposed the original method of calculating the energy range of detection of radar targets. It includes a set of objectives the following actions: the numerical values are determined by the main technical parameters of the stations, and the transfer is their decibel form; the selected value of the coefficient of volume attenuation and calculates the laws recession electromagnetic field intensity produced by the current value of the distance; the main parameter is determined by the irradiated radar target - area of its reflective surface; on the decibel parameters of the station and the area of the reflecting surface of concrete goals is the value of the radar energy potential; on the equality of the corresponding values of the laws of the electromagnetic field intensity of the recession and the values of the radar energy potential is determined by the power detection range of a radar target.

Keywords: radar, energy range, radar target, electromagnetic wave, technique

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Definition of optimum criterion of gain-frequency characteristic of transmission channel for the systems with ortogonal harmonic signals (52-54)

Liakhovetskyi L. M.

The paper is devoted to substantiation of telecommunication channel, used by transmission system applying OFDM transmission technique, amplitude-frequency characteristic optimality criterion choice. The advantages of this transmission technique which caused its extremely wide usage in the modern telecommunication technologies are considered. The relevance of the task of the searching of the telecommunication channel amplitude-frequency characteristic optimality criterion for the OFDM systems which would be convenient for practical application and would characterize transmission system performance is substantiated. Such criterion is found – it's the minimization of

the sum of the transmission channel attenuations values on all OFDM system carrier frequencies. It's proved that the proposed criterion corresponds to the data transmission rate maximization criterion.

Keywords: transmission channel, gain-frequency characteristic, OFDM-system, data transmission rate maximization criterion, ortogonal signal

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Research of the optimal moment of the signal processing beginning dependence in the orthogonal harmonic signals transmission system receiver on the signal parameters and channel characteristics (PP. 55-59)

Orieshkov V. I.

The article presents the results of the optimal moment of the signal processing beginning dependence research in the orthogonal harmonic signals transmission systems receiver from the line length, the guard time interval duration and envelope shape of the group linear signal, on the example of the ADSL2+ system, which operates on the ТПП-0.5 type multi-pair telephone cable. Effective value of the interference noise to signal ratio distribution on the downstream information channels of the ADSL2+ system, depending from the integration beginning sample number value at the guard time interval duration and line length variation is determined. The optimal integration beginning sample value depending on the signal parameters and the channel characteristics and corresponding values of the arithmetic average effective value of the interference noise to signal ratio for all information channels are determined. The possibility of localizing the optimal moment of the signal processing beginning with considering the impulse response of the transmission channel is justified.

Keywords: transmission systems, orthogonal harmonic signal, ADSL2+ system, interference noise

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A study of the algorithm of the search engine (60-63)

Bondarchuk°A.°P., Zalyva°V.°V.

The article describes the main Google search engine algorithm, its basic algorithms as well as innovations in the formation of the SERPs. Topics covered scan information, its indexing and processing. Listed list algorithm update since 2011.

Keywords: search algorithm, Google, indexation of information, search engine, processing of information, Mobilegeddon

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NQR-spectrometer for virtual designing of recognition hardwares for substance type and defence of objects for their unauthorized impact. (PP. 64-72)

Rozorinov H. N., Chichikalo N. I., Larina E. Yu., , Larin V. Yu.

The method of new virtual device creation is offered in the process of mastering of graphic programming of LabView language for the facilitation of implementation of project procedures and analysis of the got results. A method is presented as interactive teaching application, ramified contextsensitive help and examples of the use of programming receptions. It substantially facilitates implementation of research tasks by excitation of nuclear quadrupole resonance in components, containing kernels, possessing an electric quadrupole moment in the process of creation of hardwares of timely recognition and defence of objects for impacts of hazardous substances.

Keywords: virtual device, defence of objects, recognition, graphic designing of LabView language, nuclear quadrupole resonance

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The use of a statically-configurable PLD in the NQR spectrometer control digital system (73-82)

Samila A. P.

The digital control system for laboratory nuclear quadrupole resonance (NQR) Fourier radio spectrometer is developed. Functional and algorithmic methods of this system are implemented in a programmable logic device (PLD) with a static configuration – Cyclone EP1C12F324. The algorithm of the proposed software and the configuration structure of the PLD on the basis of the finite state machine and other functional modules with the use of the syntax of the modeling of dynamic modes of logical structures were created. The basis for the PLD configuration structure algorithm is synthesized finite state machine, whose output sequence alphabet Y is determined by a set of states of the machine, while the set of input symbols given alphabet X. The transition functions $f: S \times X \to S$ and the output functions $g: S \to Y$ of the state machine are described in the VHDL language. Transfer of commands for performing device provides 4-bit external interface bus with a data transfer rate of 3,15 Mbps. Radio spectrometer control system is designed as a block structure, which includes the main board, 3.5-inch liquid crystal display, controls and input/output ports. The sample unit tested in complex with frequency synthesizer and NQR radio spectrometer pulse sequences shaper. The test results showed the device matching its functionality to all regulations that apply to this class of relaxation and pulsed resonance spectroscopy equipment.

*Keywords***:** algorithm, finite state machine, character generator, PLD, radio spectrometer, control system, NQR

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The algorithm of functioning for the control system of mobile digital troposcatter-radiorelay station (83-91)

Povkhlib V. S.

The usage of the communication systems in emergency situations is requiring the mobile stations of telecommunication. Therefore, the use of mobile digital troposcatter-radiorelay stations is fully justified. This article presents an algorithm of functioning for the control system of mobile digital troposcatter-radiorelay station. The algorithm includes software and command control signals. The algorithm has non-linear structure. It contains units of multiple-choice and provides control actions for constant monitoring of the quality of communication and display of various parameters of the station. Control signals corresponding to the algorithm are formed using Walsh-Paley functions generator, one of which is located in the stationary control panel and the other – in the remote control panel. The signals described by the functions of the Walsh-Paley are also increase the speed of the control system. It is possibility because the series underlying these functions are rapidly converging.

Keywords: mobile digital troposcatter-radiorelay station, control system algorithm, control signals, Walsh-Paley functions generator.

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The complex of the software tools for simulating of the secured Grid-systems (92-98)

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In this paper is described the main stages of design and development of the complex of software tools for simulating of the secured Grid-systems. The main topic there is the description of the modification of the existing components and the design of the new components of GridSim library for developing of the software tools. The software tools allow simulate the Grid-system where are applied the different security control mechanisms, in particular, the classical security control mechanism and adaptive security control mechanism. The basic concept of the classical security control mechanism and adaptive security control mechanism are described there in brief. The library of GridSim component was used in order to develop the software tools. Also, there are described some examples of the simulation of secured Grid-system functioning. There is shown an example, which contains the input data file, the diagnostic messages of Grid-system functioning, the output data file and the graphs, which are a result of output data processing.

Keywords: secured Grid-system, secure data processing, simulating, GridSim component library

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The task of distribution of user traffic between base stations with SDR (99-105)

Skulysh M., Zastavenko A.

The possibility of using cloud-based radio access network with software defined radio to solve the problem of limited spectral resources was considered. Hardware components in this network are replaced by reusable and flexible software defined functions which run in a virtual environment. Network load balancing problem between base stations supporting SDR, which is based on determining the optimum number of subscribers for data transmission using each of the WiMAX, Wi-Fi, GSM and LTE technologies, at a given number of base stations and subscribers with fixed technology was formulated. The solution will allow automatic switching between technologies, according to the information on the network load. This will increase the effectiveness of Cloud Radio Access Network through the optimal use of radio resources.

Keywords: Cloud-RAN, software-defined radio, SDR technology, load balancing

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Congestion control tools in computer networks (PP. 106-110)

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In this article, the features, causes and ways to prevent major congestion were researched. It is shown that control method of feedback that is late is useful for adjusting incoming traffic node. It is also shown that the incorrect calculation of the characteristics of delay feedback system may lose stability and move into undamped oscillation mode, or adjust the intensity of the flow will be too late. Compensation for feedback delays can be performed by prediction methods, for example, using models and autoregressive moving average (ARMA) or by averaging settings window. The second option is easier, but, of course, provides much lower quality of service. It is shown the possibility of preventing overload based on the separation input stream method into separate input queues, which allows more flexibility to adjust incoming traffic hub in emergencies. It is also shown the possibility of using methods and quantitative characteristics of sensitivity to determine the network status.

Keywords: computer network, sensitivity functions, routing, congestion, bandwidth

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