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*S.N. Kirillov, S.A. Balyuk, S.N. Kuznetsov, A.S. Yesenin.* DEVELOPMENT OF THE MODEL OF OPTICAL SIGNAL SPREAD INTO AQUATIC ENVIRONMENT FOR UNDERWATER INFORMATION TRANSFER SYSTEMS

Key words: optical communication system, information transfer, underwater communication, absorption, scattering.

The model of propagation of the optical signal in the aquatic environment was justified, taking into account absorption and scattering. A proposed model allows to calculate signal power at the input of an optical receiver and bit error rate during information transmission. A simulation of optical signal propagation for different types of water was carried out. It is shown that video data is possible to be transmitted at a speed of 10 Mbit/s in real time at the distance of 64 m in clear ocean water, 42 m in coastal ocean water and 19 m in ocean water with intense biological activity with error not exceeding value of  $10^{-7}$  .....3

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Key words: software, video analysis, navigation, unmanned aerial vehicle.

In this work specialized software product called "Navigation" is considered. The product made by the authors realizes computer vision algorithms for estimation of position and course of unmanned aerial vehicles (UAVs). Software provides the modeling of video data from the board of UAV and flight tasks preparation. With its help source data for experimental research can be also modeled. In the work the structure of software product and its functionality are described.....9

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Key words: autonomous control algorithm, combined quality criterion, flight path, interfering factors, weight coefficients, lateral acceleration.

Control object (OC) flight algorithm of class "surface-to-surface" based on combined quality criterion is synthesized, providing its guidance on a given flight path in conditions of such interfering factors as wind gusts and presence of low-contrasted terrain images. It is shown that under the influence of these interfering factors control errors are decreased by an average of 10...20% compared with a known autonomous control algorithm .....15

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Key words: acoustic noise, classification, parameterization.

A method of signal parameterization and a procedure of feature space dimensionality decrease have been proposed to solve a classification problem of acoustic noise of engines. Realizations of acoustic noises of engines of 34 car brands have been analyzed. The expediency of signal parameterization method has been demonstrated. It's shown that offered procedure has allowed to reduce 46 times the dimension of signs initial space and divide the space of engines acoustic noise signs by means of a determined classification algorithm with probability of 97,6 % .....19

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Key words: filter matrix, packed spherical surrounded backfill, Laplace equation in spherical coordinates, spatial distribution of vector fields of uniformly magnetized sphere.

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Key words: vector autoregressive model, satellite navigation systems, parametric estimation, simulation of vector processes.

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Key words: microcontroller, discharge of static electricity, contact discharge method, test method.

Impact of static electricity on 8-bit microcontrollers such as AT89C51RC with 32 KB of flash-memory is experimentally investigated. Accumulated static electricity equal to 6.4 kV is established to damage 94% of information installed in flash-memory and 6.5 kV will lead to catastrophic damage of microcontroller. Method of testing microcontroller sensitivity to electrostatic discharge is offered.....34

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Key words: image processing algorithm, model of underwater images degradation, underwater recovery of images, wavelet filtering, homomorphic filtering, anisotropic filtering.

Effect of various confounding factors on the formation of underwater video is analyzed. Mathematical model of underwater video which takes into account various disturbing influences is proved. On the basis of this model software algorithm for underwater images preprocessing which will increase the visible range 3 ... 4 times working with video stream in real-time has been developed .....40

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Key words: adaptive accelerated routing, IGRP protocol, dynamic changes, routing algorithms, corporate networks.

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Key words: clusterization, artificial immune network, suppression coefficient, antibody, antigene, algorithm aiNet.

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Key words: neuroprocessor, neuroprocessor systems, intelligent structure, algorithms, automate models relationship, program complex "NeuroCS".

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Key words: artificial neural network, protocol, key exchange protocol, feedbackless tree parity machine.

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Key words: high-frequency electric fields, diagram of stability, trajectories of charged particles, "Focus-PRO" software package, three-dimensional ion trap mass filter.

The results of studies concerning the development of high-frequency generator voltage to power the electrodes of quadruple mass analyzer are given. Method to calculate the trajectories of charged particles in three-dimensional ion trap by using voltage with variable duty cycle applying "Focus-PRO" software package are represented. The advantage of given methods is the fact that it allows without a considerable amount of computer time to determine parameters of high voltage (amplitude, frequency and duty cycle) as well as to anticipate and to adjust main parameters of analyzer .....72

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Key words: ionization energy, deep trap, semiconductor structure.

In this paper the physical mechanism of charge of defects with deep levels - deep traps (DT) with uniform distribution of their concentration in the base of diode-like structure is discussed. The expression for calculating DT ionization energy in semiconductor barrier structures based on measurements of spectra of two deep-level transient spectroscopy (DLTS) registered at the same relaxation time constant for different impulses of reverse bias voltage is obtained. The

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Key words: surface acoustic waves, velocity of acoustic wave, counter-dowel converters.

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Key words: combining, encoding, diverted receiving, error probability.

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Key words: Takagi-Sugeno model, adaptive fuzzy regulator, fuzzy feedback, fuzzy supervisor control.

Fuzzy supervisor control has got quite good characteristics. However two functions, that is, fuzzy feedback and supervisor control are applied to a certain plant. In other words these functions can be used for the control of a particular plant. A dynamic plant model described in this article can be uncertain. Besides we offer Takagi-Sugeno fuzzy models to model these two uncertain functions. The method offered represents adaptive fuzzy control with constant setting influence. Lyapunov theorem and Barbalat lemma are employed for renewal laws of control device parameters which provide limitedness of all variable quantities of the system and asymptotic tracking control of constant setting influence reproduction. In conclusion we can say that the method offered has been successfully applied to a plant in a form of leveling tank to be convinced of its efficiency for supervisor control .....91

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Key words: interactive planning, synergetic effect, high technology enterprise, attractor, synergetic planning.

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## BRIEF REPORTS

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Key words: satellite radionavigational system, structured hindrances, noise-immunity; overland equipment of consumers; phase manipulation.

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*A.P. Avachev, N.V. Vishnyakov, Y.V. Vorobyov, Y.V. Vorobyova, K.V. Mitrofanov.* EXPERIMENTAL RESEARCH OF GST225 FILMS SURFACE STRUCTURE AND ELECTROPHYSICAL PROPERTIES

Key words: chalcogenide vitreous semiconductors, phase-change transitions, phase-change memory, thin films, atomic-force microscopy.

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*V.V. Soldatov, O.V. Soldatova, R.V. Tishkin.* PURPOSES AND TASKS OF REGIONAL CENTER OF SPACE SERVICES

Key words: cartography, GLONASS/GPS technologies, inventory of agricultural lands and forests, navigation data, distance learning, visualization of crucial and potentially dangerous objects.

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