Part 1

VIRTUAL AND INTELLIGENT SYSTEMS IN SCIENCE AND TECHNOLOGY

The article deals with results of electromechanical simulation of acoustic behavior of a sample with a metal inclusion. Electrical simulation uses a method of analogies for a research of mechanical model of a sample. The dependence of an echo-signal of an acoustic microscope on the sizes and properties of inclusion in a sample is considered.

Keywords: acoustic microscope, echo- signal, ultrasound, electromechanical simulation.

In an analysis result of images of markings of the condenser and mathematical formulas, the algorithm of automated monitoring of marking of condensers based on computation of the amount of a difference of images is developed. On the basis of researches for the size of the reference image 350⊗600 of pixels the threshold of coincidence of images of marking of the condenser and the reference image is offered.

Keywords: image, marking of the condenser, monitoring, algorithm.

The article is devoted to the development of an application software for post-processing of total pressure primary transducer data, collected in the result of sensor forward and backward passage in the plane of the cross-section of the flow created by gas-jet devices.

Keywords: gas-dynamic facilities, gas-jet devices, Pito tube, velocity field control, free stream.

In work mathematical modeling systems for carrying out of numerical researches in nonlinear dynamics have been analyzed. The choice of such systems is essentially limited, taking into account this, an open-source project was created, in which the possibility of calculating chaotic attractors and investigating time series in one application was realized. A software project plan was developed and created, in fact an iterative development model in combination with the methodology of extreme programming. The formulated requirements to the software being created gave grounds to implement the project using an object-oriented approach and design patterns.

Keywords: software, extreme programming, open-source project, object-oriented design approach, design pattern, non-linear systems, chaotic attractors.

The article deals with the electromechanical model of the power plant of the information-measuring system. Using the analogy method, the features of piezoactuator application and the influence of the adhesive rigidity with the strain gauge on the generated force are investigated. Recommendations for the manufacture of the power plant are given.

Keywords: piezoactuator rigidity, electromechanical model, elastic modulus, strain.

Article is devoted to the description of processes and implementation of an algorithm of data transfer in LED tapes. The essential shortcoming hindering wide dissemination of LED tapes for video information display is their unreliable construction. Reliability augmentation is possible due to combining of LEDs not in normal tapes, and in tapes segments, the separate controller will control each of which.

Keywords: display, light-emitting diode, LED, algorithm.

The article is devoted to designing a system for STM-probe blank positioning, using inertial piezodrive. It is shown, that usage of inertial piezoelectrical actuator allows to increase capability of the technological system.

Keywords: scanning tunneling microscope, actuator, screw-nut gear, positioning system, piezodrive.

The article is devoted to the study of the features of seismic destruction of buildings that are contradictory by their nature inertial force concepts.

Keywords: seismic destruction, earthquakes, shock wave concept.

In this paper, the principle of ultrasonic speed measurement is considered, which is based on Doppler method of frequency shift measurement between the reflect wave frequency and the incidence wave frequency. Application possibilities of chaotic dynamic system is examined, particularly Duffing oscillator, in the ultrasonic speed measurer.

Keywords: Doppler method, dynamic system, deterministic chaos, phase diagram, signal-to-noise ratio, Duffing oscillator.

A thermocouple cell of the information-measuring system for determining the activation energy of intercalation processes in oxide bronzes is described. The results of measuring the activation energy for TiO2 and WO3 oxides are presented for thermally simulated intercalation by K and Na ions in the temperature range from 50 to 600ºC.

Keywords: activation energy, electrical conductivity, thermocouple, oxide bronze, SHS.

Article is devoted to a research of change of contrast in pair strokes with various coefficients of filling as a result of harmonious vibration. It is theoretically established and are almost received the results demonstrating that with increase in coefficient of filling in strokes there is a negative contrast.

Keywords: contrast, pair strokes, filling coefficient.

Article is devoted to the problem of increasing the sensitivity of induction devices control the electrical conductivity of liquid substances. One option for increasing sensitivity is to increase the quality of the oscillatory circuit of the sensor that is proposed to implement by reducing parasitic capacitive mutual relations of the turns of the coil inductance through the application of the dielectric layer. Also presents the results of experiments demonstrating the increased sensitivity of the sensor.

Keywords: conductometry, measurement, inductive transducer sensitivity.

The article is devoted to the description of the process of developing the structure of software and the choice of hardware that allows, with the help of a prefix to a personal computer, to measure electrical signals in the control system of an automated electric drive. The Kotel'nikov theorem is the basis of the software developed for the register-based device.

Keywords: automated electric drive, digital signal processing method, hardware and software support, software, digital oscilloscope.

The article is devoted to the development of the electronic load required in the laboratory of the developer of radioelectronic equipment to study the work of various power modules, mainly power supplies. From the known solutions, the proposed device is characterized in that it is oriented to work with a personal computer when the magnitude of the load and the dynamics of its change over time are controlled using interface tools of the virtual laboratory.

Keywords: development of an electronic equipment, force electronics, the virtual laboratory, electronic loading.

The results of a comparison of the photothermal effect when the erbium laser is irradiated by a phantom of a biological tissue after impregnation with nanoparticles of oxide bronzes HxMoO3, NaxTiO2, KxMoO3 and KxWO3 are presented.

Keywords: laser, nanoparticles, photothermal effect, oxide bronzes, SHS.

Part 2

VIRTUAL AND INTELLIGENT SYSTEMS IN MEDICINE , BIOLOGY AND ECOLOGY

The article shows the relevance of the introduction of robotic stations for the automation of laboratory processes. The task of designing a typical station for automation of laboratory processes was set, the basic principles of designing a metering station for automation on the basis of a finished robotic platform were analyzed. The selection of components and components of the station for the isolation of nucleic acids was carried out. The problem of automation of isolation of nucleic acids with the help of domestic reagents is analyzed.

Keywords: robotic station, automation of laboratory processes, polymerase chain reaction.

The article is devoted to solving the problems of interaction of information systems through integration bus. The paper discusses the features of data exchange of medical and laboratory systems of the enterprise, potential software solutions, data exchange formats and data transmission protocols used during the work.

Keywords: medical information system, laboratory diagnostics, Integration bus.

The program of filtering digital images in the environment of MathCad is developed. The advantage of the program is its visualization and an opportunity to set any mask for filtering. The program is approved on the known filters. The program can be used for the educational purposes in educational institutions on discipline "Digital image processing", for carrying out laboratory researches, for training of specialists in the field of medicine.

Keywords: program, spatial filter, digital image.

On the basis of directories, the websites and normative documents the state-of-the-art review of new technical means of measurement and monitoring of the weighed particles in atmospheric air is executed. Follows from the review that the modern measuring instruments of the weighed particles are executed by classical gravimetrichesy and optical methods of measurements. At the end of article the non-standard perspective optical method of measurement of mass concentration of the weighed particles is given in atmospheric air on measurement of contrast in the image of a test object.

Keywords: methods of measurement, gages, the weighed particles, mass concentration.

The database of zoological material allows you to view the analysis of the state of the species composition of rodents, the abundance and distribution of rodents on the territory of the Issyk-Kul basin, as the main vectors of zoonotic infections, dangerous for human and animal life.

Keywords: Database, species composition, rodents, abundance, Issyk-Kul basin.

The article is devoted to the study of the effect of magnesium chlorate on the membrane potential of wheat of high germination, followed by analysis of membrane permeability with the help of the logarithmic Goldman-Hodgkin-Katz function.

Keywords: membrane potential, membrane permeability, magnesium chlorate.

The article is devoted to the study of changes in the membrane potential of wheat grains under the influence of various external factors. The article already includes proven dependencies to facilitate the study of other dependencies.

Keywords: membrane potential, rest potential, action potential, wheat grains, factors of influence, mechanical action, electrical effect, temperature change, ion concentration.

The article is devoted to the study of the distribution of carbon nanoparticles in a drop of distilled water frozen with the help of the Peltier element with the subsequent analysis of the surface pattern formed by the Benard cells.

Keywords: optical method of control, carbon nanoparticles, Sobel filter, Benard cells.

Part 3

VIRTUAL AND INTELLIGENT SYSTEMS IN ENSURING INFORMATION TECHNOLOGIES

The article is devoted to algorithms for processing monitoring data on the basis of geometric patterns. It is describes the selection of periodic parts, the creation of geometric patterns, the storage of the base of patterns in the structure of PGG.

Keywords: Processing monitoring data, the geometric pattern, PGG.

In this article we propose the application of the MDD (Model Driven Development) software development methodology to create reliable intelligent information processing systems

Keywords: quality control, model-driven development, software engineering.

In this paper we consider named entity disambiguation, particularly for place names. To solve this problem we propose statistical approach which is based on using only potential place names contexts. For our implementation of this method no annotated corpora are required, each step of the algorithm is easy to interpret (unlike machine learning algorithms) and its results are satisfactory for practical usage over big data in information retrieval.

Keywords: Toponyms extraction, text mining, disambiguation.

The article is devoted to the development of high-performance lightweight PHP Framework intended to facilitate software engineering for information

The article is devoted to the development of security and fire systems to ensure the safety of the building. In the article questions of studying of the object of protection, the selection of hardware fire and security systems.

Keywords: Security-fire alarm, regulatory documents, detectors, general technical requirements, computer-aided design AutoCAD MEP.

The article is devoted to the development of additional security measures when working with CNC "Master 34". Additional protection is achieved by using light barriers. This upgrade does not affect the operation of the machine, and does not cause difficulties during installation and provides the necessary level of protection against injury.

Keywords: modernization, photocell, safety, protective screen, optical sensor.

The article is devoted to hardware security and fire systems. In the article questions of studying of the object of protection, determine the type of systems in use, hardware security and fire subsystems and the performance of each element.

Keywords: security and fire system, false alarms, a remote control, standby power supply, the boundaries of protection of object.

The article describes the problem of controlling human fatigue. Areas of application of machine vision, in particular the use of face recognition, are considered. As a result, it was suggested that the development of a fatigue monitoring system for a user of a personal computer using face recognition is promising.

Keywords: facerecognition, Haarcascade, fatiguecontrol, machinevision.

Propose software for the calculation of the integrated risk of a particular man-made hazards electrical facilities. The software implements the operations propositional temporal logic "sometimes in the past" and "always in the past", which are used to describe temporal dependencies between risk factors and technogenic risk. Integral risk are calculated using the algorithm of Mamdani fuzzy inference.

Keywords: electrical facilities, technogenic risk, emporal logic, fuzzy inference.

The article deals with the design features of various types of fire alarm systems currently in use. In accordance with the specifics of the building and the design and installation standards, a selection of fire detection sensors for a fire alarm project is made.

Keywords: fire alarm system, emergency, flame detectors, smoke detectors.

Part 6

VIRTUAL AND INTELLIGENT SYSTEMS IN STUDENT'S WORKS

The article describes the design and the possibility of using the cloud infrastructure as a distributed and virtualized group of services for parallel processing and analysis of huge volumes of data in the sphere of IoT.

Keywords: distributed architecture, cloud computing, microservice architecture, event-driven architecture.

The article is devoted to the use of the chaos generator in the design of the distance measurement sensor in robotics. The problem of simultaneous

characteristics of signals. It has experimentally established that at increase in pulse duty factor of signals at simultaneous increase in pulse power within so-so integrated rated loads of power sources speed of perception of information increased.

Keywords: transmission, video information reception, response characteristics of signals, on-off time ratio, frequency.

The article is devoted to methods and instruments for measuring the geometric dimensions of objects used in construction, design and everyday life. It addresses the main disadvantages of existing measurement methods and describes the developing measuring system that produces a measurement on the image.

Keywords: measurement method, image processing, mobile technologies.

In article process of modeling of corrosion of metal in the pipeline under the influence of the acid environment is described. At an insignificant deviation from real corrosion this modeling will allow to prepare enough test samples with various extent of corrosion for obtaining test images. Test images allow to create an algorithm of recognition of corrosion damages by a photometric research of samples by means of the video camera of the color image.

Keywords: corrosion, modeling, photometric research, video camera. Kommersant.

The article is devoted to a research of dependence of electric resistance of a brick raw on humidity of mix.

Keywords: humidity of a concrete brick raw, electric resistance, express quality control.

The article is devoted to the principles and technologies of developing and building a "smart home", examines the requirements for hardware and software for building a "smart home".

Keywords: "smart house", automation, sensors, control.

The article substantiates the appearance of an error in determining the parameters of transient processes by means of an ADC. Calculations are made that relate the sampling frequency of the ADC and the error in determining .

Keywords: transient, analog-to-digital converter, sampling frequency, capacitive converter.

The article is devoted to application of special nozzles - spray jets in systems of the automated watering and the surface humidification of ornamental exotic houseplants.

Keywords: humidity control, exotic houseplants, system of the automated watering, nozzles - spray jets.

The article is devoted to the study and selection of the central unit for the control system "smart house". In work the analysis of central control of devices used in existing systems, the proposed alternative device is a block diagram of the system of "smart home" scenarios work.

Keywords: control system, smart home, programmable logic controllers, motion sensors and temperature, multi-functional Arduino Board.

ПРАВИЛА ОФОРМЛЕНИЯ СТАТЬИ

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