

Belyaeva A. O., Soltsev V. A. *Modeling of the Diffusion Process in Semiconductor Branch of Thermoelectrical Unit Through the Barrier Layer* 2

The two-step mathematical modeling of the diffusion process, which are running in thermo-electrical unit, was made. Mathematical model of the materials diffusion process in multi-layer structure semiconducting branch without layers defects was developed on the first step. And model with defects of layers was developed on the second step. The results of the mathematical modeling are given here, they shows us, that the defects of barrier layers have influence on diffusion velocity much more than the type of barrier layer material.

Keywords: mathematical modeling, thermoelectricity, thermo-electrical units, semiconductors, Peltier effect, bismuth telluride, reliability, diffusion.

Mukhurov N. I., Efremov G. I., Zhvavyi S. P. *Embodiments of Electrostatic Torsion Microscanners of Optimized Functional parameters* 7

In the present work we have considered constructive principles of formation electrostatic torsion micro scanners with the expanded range of a controlled phase of an operational cycle. We offer calculation formulas, circuits of devices and their base dependences of voltage U on a rotation angel α of an anchor are resulted.

Keywords: MEMS, electrostatic microscanners, designs, optimization of parameters.

Egorov V. V. *Problems of Modeling Nano- and Microstructures* 15

It is represent substantiation of algorithms of modeling of multidimensional fields.

Keywords: field, Poisson process, algorithm, probability distribution, majorant, multimodal probability density, stochastic process.

Tarnavsky G. A. *Implantation of Doping Impurities in Silicon Substrate with Unplanar Surface* 21

The investigation of technological process parameters effect (sighting angle and energy of implantation) on concentrations distributions of doping impurities in silicon substrate are conducted by computer simulation.

Keywords: computer simulation, doping in silicon, implantation, donor and acceptor impurities.

Averin I. A., Anoshkin Yu. V., Pecherskaja R. M. *Research of Surfaces of Resistive Structures Layers at Low-dimensional Level* 25

Researches of morphostructure layers of resistive structures on the basis of chrome-nickel alloys on lowdimensional level. Mechanisms of layer formation by means of clusters are established. On the basis of thermodynamic and fractal aspects the physical and mathematical model controlling the cluster size by means of layers condensation conditions used for a method of thermal evaporation in vacuum is developed.

Keywords: morphostructure, a layer, resistive structure, a surface, fractal dimension, cluster, model, lowdimensional level, information-measuring device, condensation.

Raspopov V. Ya., Ivanov Yu. V., Malyutin D. M., Alaluev R. V., Pogorelov M. G., Shvedov A. P., Lihosherst V. V., Tovkach S. E. *Information — Measuring Microsystems for Mobile Objects* 27

The information data-measuring microsystems developed in the Control Devices Department of the Tula State University for solving of the movement parameters measurement problems is considered.

Keywords: micromechanical accelerometer, level sensor, pyrometric sensor, magnetic sensor, inertial navigational microsystem, rate sensor.

Boronahin A. M., Ivanov P. A., Surov I. L. *The Investigation of Errors of MEMS-Based Gyro Triad by Means of Small-Sized Two-Axis Rotary Test Table.* 35

The paper presents the analysis of MEMS-based gyro triad errors that was carried out in order to refine conventional signal models for the sensors of such kind. The research has been performed by using a small-sized two-axis rotary test table developed by department of Laser Measurement and Navigation Systems of Saint-Petersburg Electrotechnical University by request of Center of Microelectronics and Diagnostics.

Keywords: inertial navigation, error model, micromechanical gyro, small-sized two-axis test table.

Pivonenkov B. I., Shkolnikov V. M. *Single- and Three-Axis Piezoresistive Accelerometers with Air Damping* . . . 42

Constructions of three kinds of piezoresistive accelerometers with air damping are described: single- and three-axis accelerometers with separate inertia mass and integral single-axis accelerometer (MEMS-accelerometer). Experimental data are given. Accelerometers have high dynamic and strength properties. An advisability of production of MEMS-three-axis piezoresistive accelerometer is shown.

Keywords: piezoresistive accelerometer, sensor, MEMS (Microelectromechanical systems), three-axis accelerometer, air damping, vibration strength, shock resistance.

Timoshenkov S. P., Kalugin V. V., Shalimov A. S., Anchutin S. A., Morozova E. S. *Dual-Channel Capacitive Decoder of Acceleration.* 46

The present work describes one of the possible achievement of capacitive decoder of acceleration with the use of national integrated circuit, manufactured by "Angstrom". The results of researching are also presented.

Keywords: microelectromechanical systems, capacitive accelerometers.

Potapov A. A. *Calculation of the Strength of Bonding Homonuclear of Molecules, Forming atoms of I Group of the Table of D. I. Mendeleev* 49

Is proposed to discuss the mechanism of forming chemical bond for a simple homocare molecules formed from atoms of the first group of Mendeleev table. The equation for the energy link between the atoms, based on the use of the classical.

Keywords: atom, a molecule, a chemical bond, electron, an atom frame, interaction charges, nanotechnology, atom-molecular assemblage.

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