

ABSTRACTS

Probabilistic interpretation of serendipity surfaces / N. Adrieieva, A. Khomchenko // Geometric modeling and information technologies. – 2018. – № 1 (5), April 2018. – P. 5-8: Pic. 1. – Ref.: 7 title.

The probabilistic interpretation of serendipity surfaces allows the release standard models from the physical inadequacy of the nodal load spectra (Zenkevich's paradox). The paper considers models of bicubic interpretation of Q12. The probabilistic interpretation creates conditions for the models "controversy". Serendipic surfaces as functions of a random vector return the natural content to the models' integral characteristics. This also applies to standard models. In the paper among the non-standard models three models with special "portraits" of zero-level lines are presented. In these examples, only straight lines "work" at the scientific level. Along the double integration method, a simple and efficient procedure of stratified averaging is proposed (nine application rule) for determination of the integral characteristics of bicubic surfaces. This method greatly simplifies the construction of basic functions. Special properties of the basic functions show that even four applicators are quite enough to get the exact value of the integral characteristic.

Analysis of methods of geometrical modeling of solids projection drawings in AutoCAD system / H. Bidnichenko, A. Bukharin, S. Pigur // Geometric modeling and information technologies. – 2018. – № 1 (5), April 2018. – P. 9-15: Pic. 13. – Ref.: 4 title.

This article is devoted to the actual question of obtaining plane two-dimensional drawings by the means of the AutoCAD graphical system. The algorithms of two methods for obtaining two-dimensional projection drawings of machine-building components are considered: two-dimensional modeling of a complex drawing of a solid using two-dimensional modeling commands and a layout of a flat drawing from a formed three-dimensional model.

The article gives a method for obtaining plane images of machine-building details by commands for creating graphic primitives and editing them. Some commands and features of their use are given, recommendations for creating objects are provided. Such a method of geometric modeling of a complex drawing of a component is basic and most widespread in practical use in design developments of various branches.

One of the algorithms offered in the AutoCAD system, the construction of a three-dimensional model from standard bodies is implemented. The formation of the projection drawing by floating display screens from the built 3D model in the Classic AutoCAD interface is fulfilled. Such images are created automatically by the system, which simplifies and accelerates the work of the designer, but requires certain skills and abilities to master this way of modeling drawings.

The article analyzes the advantages and disadvantages of the considered methods. It is noted that 3D modeling assumes that the user is confident in working with flat, two-dimensional images, but this is more time-consuming process than constructing projections on a plane.

Automated system of virtual mechanical resource tests of RES on the basis of geometric computer modeling / V. Bondarenko, B. Gunko // Geometric modeling and information technologies. – 2018. – № 1 (5), April 2018. – P. 16-21: Pic. 1. – Ref.: 4 title.

Formulation of the problem. Virtual testing of objects during project activity and production is becoming more and more relevant, and they begin to slowly displace the nature tests. Accordingly, much attention is devoted to the creation and implementation of scientific developments on the development of complete systems of virtual testing.

The main material. Since the development and release of new products of the electronic industry must be performed in rather limited time, one of the problems is the provision and management of the quality of the product being developed. To determine the product's reliability, durability will be used.

It is proposed to use accelerated resource tests, the purpose of which is to accelerate the assessment of reliability through the intensification of degradation processes.

The introduction of automated computer systems for testing is proposed. Accordingly, an automated system for ensuring the reliability and quality of the ASONICA equipment was selected.

Conclusions. 1. Found and analyzed documentation that regulates the methods of testing military equipment for various types of external influences. 2. The introduction of the ASONICA automated subsystem - ASONIKA-VVMR into the structure of ASONIKA, with the help of which is implemented computer simulation of the system of virtual mechanical resource tests REF.

Geometric methods for optimizing clusters of cellular base stations / V. Bondarenko, I. Kozar // Geometric modeling and information technologies. – 2018. – № 1 (5), April 2018. – P. 22-28: Pic. 7, table 1. – Ref.: 5 title.

Formulation of the problem. Efficient planning of the deployment of base stations (BS) is a key issue for cellular operators in routing and improving the cellular network.

Formulating Goals. The purpose of this work is to formulate optimal requirements for the location of base stations and to develop an algorithm for calculating coverage areas and their correction in the future.

The main material. Base station coverage – polygons in which it is expected that the signal of this state will be higher than the signal of other stations. In the area of cellular network planning, there are software products that are able to calculate the coverage area of individually-allocated BSs. With these programs it is not possible to analyze the clustered system of the location of the BS. Thus, the urgent need for an algorithm for calculating the BS system.

The method of weighted least squares. You can get a set of vector-solutions r , using the method of weighted least squares (WLS). The essence of the WLS consists in the introduction of the W -matrix of W weights in such a way that the source system $A \times r = d$ is transformed into a system of the form $W \times M \times r = W \times d$.

Conclusions. 1. The geometric variant of the algorithm for calculating the size of the coverage areas of the BS cellular communication is proposed and verified. 2. The proposed improved WLS in comparison with the WLS allows you to know the set of decisions covering the territory of the BS group.

Surface modeling algorithms in natural parametrization / V. Borisenko, A. Ustenko // Geometric modeling and information technologies. – 2018. – № 1 (5), April 2018. – P. 29-38: Pic. 10. – Ref.: 13 title.

The question of developing new methods for surface geometric modeling disturbs the specialists of various branches of science both in the theoretical and practical terms. Known methods for representing surfaces (analytical, kinematic, projective, through nonlinear transformations of space) are characterized by certain advantages and disadvantages

Surface modeling methods must meet certain requirements arising from the practice of their application in describing the outlines of technologically complex industries, and the requirements due to the need to provide such properties of surfaces as: continuity, smoothness (the continuity of partial derivatives or differentiation), the absence of "dents" and "folds", unconditioned by the nature of the source information.

The purpose of this work is the consistent consideration of methods of surface geometric modeling in natural parameterization and the use of linear and nonlinear laws of the distribution of curvature relative to the principal directions of the modeled surface. The choice of the law of the distribution of the curvature is determined by the available geometric information used in surface modeling.

The application of the linear laws of the distribution of the curvature along the main directions of the surface ensures its passage through three given points of space and the given angles of inclination of the tangents at the initial and final points. Adding to consider angles of tangents at the endpoints of the main directions of the surface is another factor in the form of modeled surface.

The application of nonlinear and linear laws of the distribution of the curvature provided the passage of the surface through four given points of space and the angles of inclination of tangents at the initial and final points of the curvilinear coordinates were given.

To ensure the passage of a section of a surface through four given points and the angles of inclination of tangents in the direction of both coordinate lines, it was necessary to apply the laws of the distribution of curvature in the form of algebraic curves of the second order.

Technologies of automatical information systems' development / O. Bulgakova, I. Afanasiev // Geometric modeling and information technologies. – 2018. – № 1 (5), April 2018. – P. 39-45: Pic. 1, table 1. – Ref.: 10 title.

The main technologies of the 21st century in the whole world are recognized as information and communication technological processes on the basis of the concepts of interconnection. The great importance of the definition and role of New Technologies in the educational process is the understanding of the nature of knowledge. A huge role in the establishment and significance of the latest technology in the educational process is considered to represent the cognition nature. This is a fundamentally different type of knowledge, it's more dynamic form and, at the same time, a new form of education. A combination of humanitarian and scientific knowledges is being carried out. Its target is not to remember the large size of practical material which is used, but the ability of understanding it quickly and easily.

A significant part of innovative plans for introducing changes containing innovations in its basis does not reach the practical implementation, due to the lack of adoption such innovations for modern education. Many teachers can not or do not want to learn the latest technologies, which can only improve the training and bring it to students with minimum of teacher's interference. The article presents examples of three newest systems such as Uchi.ru, Moodle and ATutor, which have both positive and negative qualities for users. Based on the criteria for evaluation, a profound analysis each of them was developed, such as: flexibility, communication, focus on studying a particular material, focusing on the student's age and controlling the system's access. Each item of evaluation should be taken into account, as it primarily affects the quality of work with remote learning. The result of this article is the research and selection of a universal system that will have as much benefits as possible in its usage.

Legal aspects of activities of professionals in information technology / I. Dmytruk // Geometric modeling and information technologies. – 2018. – № 1 (5), April 2018. – P. 46-50. – Ref.: 6 title.

Introduction. Any kind of human activity is impossible without a proper scientific and technical component and sufficient level of education.

During the rapid development of information technology, the key issue is the legal provision of work for workers in this field. They enter into legal relations directly as subjects of the labor law. However, the subject of activities in the field of information technology is governed by civil law, in particular, intellectual property rights.

If we consider the functioning of such entities more widely, then one person can simulate situations in which workers of this sphere actively use any branches of law in their day-to-day practical work, for example, criminal, administrative, family, economic, and others. That is the specifics of authority determine the scope of legal regulation and protection.

Analysis of recent research and publications. The research of such scholar-lawyers as Bachilo V.L., Vinogradova G.V., Kormich B.A., Kostetska T.A., Maruschak A.I., Yatsyshyn Y.V., and also other scientists, namely Antonov V.M., Ovcharuk OV, Tsymbalyuk VS, Tsymbaliuk M.M. are exploring this direction.

The purpose of the article is definition the impact of legal education on the effectiveness of the activities of specialists in the field of information technology, to investigate the relationship between the provision of legal knowledge in higher education institutions and the increase of legal consciousness, the ability to form a competitive specialist who will be able to perform the relevant functions, to research the field of law, which directly regulate their practical component.

Main body. The article touches on the legal aspects of the activities of specialists in the field of information technology. The basic branches of law, which the specialist can apply in his activity, are determined. The influence of the competent approach to the formation of legal consciousness is highlighted. An analysis of legal acts is under way. The characteristic of legal relations is provided, which enters a specialist in the field of information technology. He carries out his professional duties and rights.

Conclusions. The basic characteristic is the ability to make professional decisions in human rights activities. There are justified by legislative norms, which is based on their ability to navigate in legal phenomena. The basis of the ability of a future specialist to establish causal relationships in the right-realization activity. These two activities are understood as a set of systematic actions aimed at establishing legal values in society.

Problems and prospects for development of electronic trade in Ukraine / V. Zosimov, O. Berko // Geometric modeling and information technologies. – 2018. – № 1 (5), April 2018. – P. 51-57. – Ref.: 11 title.

Internet has become an important means for conducting e-business on the basis of modern technologies. E-commerce, like the Internet itself, has become an integral part of civilization and encompasses more and more new operations and processes. For the effective conduct of business on the Internet and the further development of e-commerce it is necessary to take into account its features and take into account all factors that can both slow down and vice versa promote e-commerce development. Many scholars engaged in research in this area, among them D.S. Antonenko, N.M. Boreyko, L.B. Samoilenko and others. However, there is still an urgent need for further research taking into account modern Internet technologies. The article outlines identified problems that negatively affect the development of the Ukrainian online trade market. The most acute of these is the lack of proper legal support for e-commerce in Ukraine. Other negative factors to be solved. This is the absence (partial coverage) of the Internet in the regions; poor quality service; little developed electronic payment system. The research also identified factors that influence the effectiveness of e-commerce development, the main of which is the integration of sales channels and the new trend of RichContent (formatted content). The analysis of possible perspectives of Ukrainian Internet business development was conducted. Also, real offers on effective e-business conduct and further development of e-commerce in Ukraine are provided. First of all, it is the conduct of honest business and the conquest of trust. Next, ensure the proper quality of electronic service. These are the relevant services that allow you to make purchases, taking into account the wishes of customers (cash payment, card, virtual money, round-the-clock hotline free of charge, online consultation, feedback and suggestions, providing information while avoiding chaos and information overload, intuition, clarity; the possibility of comparison, product rating). These are services of site promotion in search engines, advertising.

The analysis of the web-site content quality / V. Zosimov, S. Sachenko // Geometric modeling and information technologies. – 2018. – № 1 (5), April 2018. – P. 58-64: Table 1. – Ref.: 6 title.

A web-site user is attracted by valuable information, so the task for a web developer is to present it in the most representative style, which in turn arises the problem of web-site content quality assessment.

Comparing of a web site with other ones does not give adequate assessment of a web-site content quality. Consequently, the problem of test criteria establishment, which will give more objective web-site assessment, remains open.

The article marks out 5 main areas of the analysis of the web-site content quality.

1. The relevance of a web-site semantic kernel
2. The web-site investigation from visitors' point of view that determines the value of pages content, accessibility and usefulness of the texts placed for a user on a web-site.
3. The necessary content quantity determination. In this case, the optimal number of web-site pages is determined and the amount of texts per a page is analyzed including both search engine and visitor queries.
4. The content and linguistic aspect of a resource. A very important factor is duplication check of texts on web pages. In addition, spelling and stylistic mistakes must be checked.
5. The graphical analysis includes checking of formal correctness of texts on web pages, prints, headings, high lightings, and references.

The computing technology of fuzzy search in a text or in a dictionary / K. Kuzma // Geometric modeling and information technologies. – 2018. – № 1 (5), April 2018. – P. 65-69: List. 1. – Ref.: 9 title.

The technology of fuzzy search allows you to extend the query close by writing the words contained in any database, the archive of documents.

Modern search engines have the following features: indexing text; keyword search; morphological search – search by word's form; logical query language, which allows you to specify the conditions for the joint entry (not entry) of the keywords in the document; ranking of documents according to the key request.

However, at today's speeds of information growth in the Internet, these opportunities are no longer enough. Therefore, modern search engines are equipped with additional search tools.

The aim of the work is to develop the fuzzy search technology for information systems implemented on the MySQL database using PHP functions. The proposed technology is based on the calculation of the Damerau-Levenstein distance. The similarity of two strings in MySQL is determined by the Torres function `damlevlim()`, because during testing it showed the fastest result. In PHP, the similarity of each result with the search query is calculated by the function `similar_text()`, which returns the number of matching characters in two strings. This implementation of the algorithm does not use the stack; instead, recursive calls are used, which in some cases accelerates the search process.

It has been determined that computing technology works effectively when comparing a search query with a small-sized dictionary. It is appropriate to use it to search for names according to an existing dictionary, in which it is highly probable that a user may make a mistake of at least one character. As a result of the research, it has been found that, since MySQL today does not offer an embedded solution for fuzzy searches in a text or in a dictionary, development of effective computing technologies capable for expanding the functionality of website search engines is actual.

Mechanical parameters of the inertial opening of a four-link pendulum in weightlessness / L. Kutsenko, L. Zapolsky // Geometric modeling and information technologies. – 2018. – № 1 (5), April 2018. – P. 70-79: Pic. 12. – Ref.: 18 title.

Mechanical parameters of the opening of the frame element of the orbital object as a process of oscillation of a multi-tiered pendulum under conditions of weightlessness are determined. The oscillations are due to the influence of the momentum of the pyrotechnic jet engine on the end point of the pendulum link. The description of the inertial opening of the pendulum is performed using the Lagrange equation of the second kind. The obtained results are expedient for use in designing the unfolding of structures in conditions of weightlessness, for example, skeletons for solar mirrors.

Actual problems and approaches to provide cyberbeeping of automatic banking system / S. Lukianchikov, S. Evdokimov // Geometric modeling and information technologies. – 2018. – № 1 (5), April 2018. – P. 80-85: Pic. 1. – Ref.: 7 title.

The daily activities of automated banking systems are closely linked with the use of modern computer technology and is fully dependent on the reliable and uninterrupted operation of electronic computing systems. The problem of cyber security is unknowingly ignored. In order to resist crimes in the field of computer information or to reduce losses, it becomes necessary to choose the right means of ensuring the security of information from penetration and unauthorized access to it.

Security information measures include:

1. Access control (access control).
2. Identification and authentication (process users, etc.).
3. Registration and analysis of events.
4. Control of the integrity of objects.
5. Data encryption.
6. Resource and component backup.

One of the effective methods for implementing information integrity requirements is cryptographic information protection (encryption, hashing, electronic digital signature). Rivest, Shamir and Adleman are one of the most common methods of encryption today. The security system as a whole is a continuous process of identification, analysis and control.

Model of synergistic approach – assessment of the security of banking systems. In the process of analyzing information security risks, specialized software complexes can be used to automate the process of analysis of raw data and calculate risks. Information security models include: confidentiality, integrity and availability.

A promising direction of further research is the processing of the essence and content of security profiles, which are part of the system of protection of banking information.

Mathematical modeling of the hydroacoustic information digital communication channel / V. Melnik // Geometric modeling and information technologies. – 2018. – № 1 (5), April 2018. – P. 86-90: Pic. 3. – Ref.: 6 title.

The article poses and solves the problems of developing such conditions for a hydroacoustic information channel built on electro-hydraulic radiators of a spherical type and a piezoceramic receiver. The aim of the present work is the mathematical formulation and solution of the problem of radiation and reception of acoustic pulses by spherical transducers.

To evaluate the passage of the speech signal through the medium, the mathematical model of the hydroacoustic communication channel was taken into account, reflecting the essential hydrological factors affecting the transmission of the emitter signals.

When modeling the aquatic environment as a "black box", the amplitude-frequency and phase characteristics between the important points of the input and output of the acoustic signal were determined.

The hydroacoustic communication channel must satisfy certain requirements for the transmission of the speech signal. In the paper, the capacity of the hydroacoustic information channel in the sound spectrum of frequencies and methods of speech coding are determined.

Information-measuring system for registration of pulse pressure in liquid environment / O. Melnik // Geometric modeling and information technologies. – 2018. – № 1 (5), April 2018. – P. 91-95: Pic. 2. – Ref.: 5 title.

In experimental studies of impulse processes, there is a need for continuous monitoring of their parameters, which provide important information about physical phenomena in existing pulsed technologies. The work is devoted to the development of information and measurement system for determining impulse pressure. Proximity to the source of pulse pressure, the need to resolve the sensing element of the sensor and the circuit of the electric circuit, which runs a pulse current of about 104 A, the presence of strong electromagnetic fields that accompany the discharge, increases the level of requirements for the information-measuring system. The information-measuring system is developed, which ensures reliability of the obtained results of measurements and reliability of functioning in such conditions. Its distinguishing feature is the high sensitivity of the sensor, which generates a useful signal with an amplitude of 10 to 100 V, but it is dangerous for the recording equipment. To reduce its level, a measuring path is used to provide resistance to electrical interferences at a close distance from the discharge channel. The chosen circuit solution will ensure the stability and reliability of the indications of the information-measuring system.

Development an applet to anonymize traffic using the Tor network / H. Pohromska, H. Chernyshchuk // Geometric modeling and information technologies. – 2018. – № 1 (5), April 2018. – P. 96-104: Pic. 4, list. 5. – Ref.: 13 title.

Increasing anonymity often makes staying on the Internet less convenient. Often, users worried about their own anonymity are looking for a «golden mean» between anonymity and ease of use. There are methods of anonymizing on the network to solve this problem. But the convenience of setting up many virtual proxy servers remains unresolved

The article analyzes anonymization methods of traffic (VPN, proxy server, I2P, SSH-tunnel, dedicated server) and outlines their advantages and disadvantages. Tor was chosen as the most versatile and flexible method. Now there is no application with the interface for convenient configuration of the virtual proxy server Tor.

The purpose of the article was to develop software for the convenient operation and configuration of the local proxy Tor with integration into the desktop environment

The «Tor Button» software is an applet for the Cinnamon desktop environment, written in the JavaScript programming language using the API for interacting with the environment. The goal of «Tor Button» is to conveniently launch and configure the Tor virtual proxy, which allows you to pass any traffic through it. The offered software product provides: convenient access to launching a proxy server; the ability to choose the path to the server and the configuration file; the ability to start the server on behalf of the user of the network; the ability to quickly rebuild the network chain. The software product «Tor Button» was posted on the official website of applets for Cinnamon (<https://cinnamon-spices.linuxmint.com/applets/view/298>) under the author's name.

The practicality of the applet is provided by a simple and ergonomic interface. Open source and access to the page on GitHub provides an opportunity for each user to expand the functionality or add a translation into their native language. The applet already is translated into Danish, Russian, Turkish and Chinese.

The prospect of work is to integrate with the system, the free, accessible and open source of the code of the developed software, which provides an opportunity to improve the product and use the resulting gains in other projects.

A study of the distribution of curvature given by an exponential law / S. Ustenko, I. Ustenko // Geometric modeling and information technologies. – 2018. – № 1 (5), April 2018. – P. 105-111: Pic. 13. – Ref.: 10 title.

The article investigates the distribution of the curvature given by the exponential law for further application in geometric modeling of plane curves. The work is a continuation of the research conducted by the team of the Department of Computer Engineering within the framework of the research topic. An algorithm is proposed for forming a section of the curve of a line on the basis of the curvature distribution law in general form. Curves of the distribution of the curvature and the slopes of the tangents to the curve are constructed. The problem of constructing the dependences of the curvature distribution crossing the abscissa is solved.