ACTUAL PROBLEMS OF MODERN SCIENCE, EDUCATION AND TRAINING

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CONTENTS

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RISK ASSESSMENT OF INVESTMENT PROJECTS IN THE DIGITAL ECONOMY

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Annotatsiya. Maqolada raqamli iqtisodiyot sharoitida investitsiya loyihalari risklarini baholash haqida so'z boradi. Investitsion qarorlarni qabul qilish istiqbolli investitsiya ob'ektlarining investitsiya sifatlarini baholashga asoslanadi, bu zamonaviy investitsiya tahlili metodologiyasiga muvofiq ma'lum bir mezon ko'rsatkichlari bo'yicha amalga oshiriladi. Investitsiyalar samaradorligi ko'rsatkichlarining qiymatlarini aniqlash ko'rib chiqilayotgan investitsiya ob'ektini keyingi tahlil qilish uchun maqbullik nuqtai nazaridan baholash, bir qator raqobatdosh investitsiya ob'ektlari va ularning reytingini qiyosiy baholashni amalga oshirish, investitsiya loyihalari to'plamini tanlash imkonini beradi. samaradorlik va xavfning ma'lum nisbati. Ma'lumki, investitsiya qilishning asosiy maqsadi foyda olishdir. Ammo mablag' qo'yilgan har bir ob'ekt daromad keltira olmaydi. Shuning uchun investitsiya loyihasining samaradorligini tahlil qilish va baholash nihoyatda muhimdir, bu ham loyihaning investorlar uchun jozibadorligiga hissa qo'shadi.

Kalit so'zlar: tavakkalchilik, investitsiya loyihasi, ekspertiza, xavfni baholash, raqamli iqtisodiyot.

Аннотация. Статья посвящена оценке рисков инвестиционных проектов в условиях цифровой экономики. Принятие инвестиционных решений основывается на оценке инвестиционных качеств перспективных объектов инвестирования, которая в соответствии с методологией современного инвестиционного анализа осуществляется по определенному набору критериальных показателей эффективности. Определение значений показателей эффективности инвестирования дает возможность оценить рассматриваемый объект инвестирования с позиций приемлемости для дальнейшего анализа, произвести сравнительную оценку ряда конкурирующих объектов инвестирования и их ранжирование, выбрать совокупность инвестиционных проектов, обеспечивающих заданное соотношение эффективности и риска. Как известно, основная цель инвестирования – получение прибыли. Но не каждый объект, в который вложены средства, способен приносить доход. Поэтому крайне важно проанализировать и оценить эффективность инвестиционного проекта, что также способствует повышению привлекательности проекта для инвесторов.

Ключевые слова: риск, инвестиционный проект, экспертиза, оценка риска, цифровая экономика.

Abstract. The article deals with assessment of risks of investment projects in condition of digital economy. Investment decision-making is based on the assessment

of the investment qualities of prospective investment objects, which, in accordance with the methodology of modern investment analysis, is carried out according to a certain set of criterial performance indicators. Determining the values of investment efficiency indicators makes it possible to evaluate the considered investment object from the standpoint of acceptability for further analysis, to make a comparative assessment of a number of competing investment objects and their ranking, to select a set of investment projects that provide a given ratio of efficiency and risk. As you know, the main purpose of investing is to make a profit. But not every object in which funds are invested is able to generate income. Therefore, it is extremely important to analyze and evaluate the effectiveness of the investment project, which also contributes to the attractiveness of the project to investors.

Keywords: risk, investment project, expertise, risk assessment, digital economy.

Introduction: Risk analysis allows corporations, governments, and investors to assess the likelihood that an adverse event could negatively affect the economy, project, or investment. Risk assessment is important to determine how profitable a particular project or investment, as well as to determine the best processes to mitigate these risks,(G.M.Bekimbetova, 2020). Risk analysis offers various approaches that can be used to assess risks and rewards in the event of a potential investment opportunity.

Risk is essentially the possibility of financial losses. It is used as a synonym for uncertainty and refers to the variability of returns associated with an investment project. Since the projects are independent or mutually exclusive, it is important to use analytical methods according to each specific situation(R.Karlibaeva, 2021). The presence of uncertainty means that decisions and behaviors are not based on routine. Indeed, financial decisions are made in an environment of uncertainty(Junkes et al., 2015)(J. N. Shaturaev & Jumaev, 2019). A risk event can be considered as a separate event that affects the project for better or worse, while uncertainty occurs when decision makers are able to make decisions about the project.(G.Bekimbetova, 2020)However, there is insufficient and clear information available, which reduces confidence in evaluating alternatives and their associated risks, thus making it more difficult to make a decision.

Risk analysts often work in tandem with forecasting professionals to minimize future negative unintended consequences. All firms and individuals face certain risks. The problem is that too much risk can lead to failure. Risk analysis allows you to find a balance between accepting risks and reducing them.

Theoretical aspects of the study. Project risks can be classified according to their expression at different stages of the investment project(Ilona V. Tregub, 2017):

1. The risk of insufficient financial support for the investment project. This risk is associated with the possible default of sponsors and the inability to finance the project. This type of risk may be due to various reasons such as the negligence of the participants, the financial situation of the parties, change managers, various external causes(Jensen & Smith, Jr., 2005). Insufficient funding may result in incomplete completion of the investment project (failure to meet the planned production capacity, inability to organize a full production cycle, etc.).

2. Risk of increasing the project cost. This risk is determined by the possibility of increasing the investment costs after the project funding has already begun(Bekefi et al., 2008). This may be due to failure of supplier errors in forecasts, the increase in prices, taxes, duties, etc. To reduce this risk in the conditions it is recommended to enter into contracts at fixed prices to inflate costs in the case of the participation of intermediaries(G.Bekimbetova, 2019).

3. Plan the risk. This type of risk associated with the failure of the supplier's obligations, errors in the forecast changes in the environment, administrative risks, accidents, force majeure and is associated with the failure of the project on time because of delays in the construction of the project, terms of delivery, etc.(Shevchenko & Ustinovichius, 2010)(J. Shaturaev, 2021). The specifics require appropriate measures to minimize this risk, such as contractual penalties for delays.

4. Risk of non-fulfillment of the project to the required level of technical or qualitative indicators. We are talking about identified defects in the delivered equipment, errors that prevent the organization of production, reaching the planned production capacity, ensuring the required product quality, etc. This risk is usually the result of suppliers ' failure to meet their obligations and forecasting errors. To reduce this type of risk in the Russian economy, it is recommended to conduct an expert review of project execution at different stages.

5. Risk of technical infeasibility of the project. This type of risk is a borderline case of the previous risk. Technical infeasibility of a project can result from gross errors in the design of the project, the selection of project results and the main process. This risk is typical for projects involving innovative products or technological innovations.

Risks of the processing stage

6. Production risks. Risks of this group are related to interruptions in the production process, increased costs, technical problems (technical risk), supply disruptions (transport risk), environmental problems (environmental risk), management incompetence (management risk), etc.

7. Marketing risks. Risks of this group are represented by non-fulfillment of the planned sales volume, planned product prices, delayed market entry, etc.

Risks that arise both at the investment stage and at the processing stage.

8. Risk of default by suppliers. This type of risk is associated with non-delivery or incorrect delivery of equipment, delays or errors in construction and installation work, and failure to perform warranty service. This risk is associated with increased costs, delays in procurement, failure to achieve the required level of quality of execution and, consequently, with the overall objectives of the project.

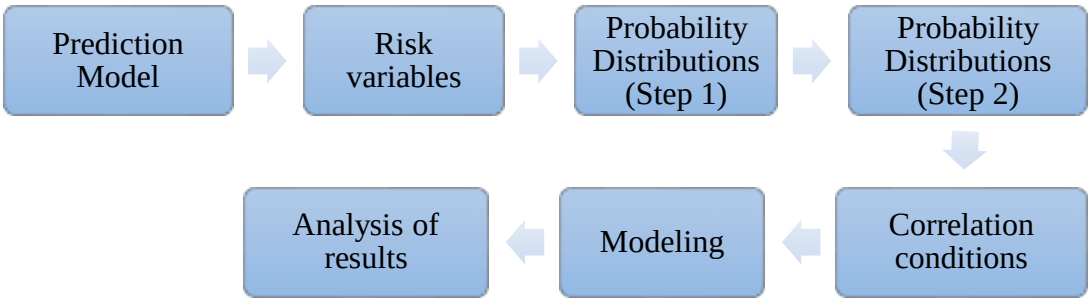
9. Management risks. These risks may occur in the processing phase of the project as the production risks or variants occur at the stage of investments(USMAN & MIKHAILOVA, 2020). This type of risk is usually associated with errors in management control, as a result of which it is not possible to complete the construction of an object, purchase or install equipment, organize production and sale. The main risk factors are the lack of experience and inadequate qualifications of managers, and the change of management staff.

10. Administrative risks. These risks are related to difficulties in obtaining a permit or license, or changes in the rules during the project implementation.

11. Financial risks. These risks are associated with the ability to produce negative returns in a situation of uncertainty(Maria Goreti usboko, 2018).(G.Bekimbetova, 2019) The main financial risks are the risk of fluctuations in the purchasing power of money (inflationary risk, deflationary risk, currency risk), and interest rate risk.

Methodology aspects of the study. Methodology and hypotheses. Risk analysis or "probabilistic modeling", based on the Monte Carlo simulation method, is a methodology that processes uncertainty covering the main variables predicted in the prediction model to assess the impact of risk on the predicted outcomes. This is a method by which a mathematical model is subjected to a series of simulations, usually using a computer. In the process of modeling sequential scripts are created using the input values for the key uncertain variables for the project, selected from a multi-valued probability distributions(Savvakis, 2008).

The risk analysis process can be broken down into the following steps, as shown in pic.1.



Picture 1. Risk Analysis Process (Savvakis, 2008)

Modeling is controlled in such a way that a random selection of values from the specified probability distributions does not violate the existence of known or assumed correlations between project variables. The results are collected and analyzed statistically to arrive at a probability distribution of potential project outcomes and evaluate various project risk measures.

Forecasting model-preparing a model that can predict reality.

Risk variables - select key project variables.

Probability distributions (step 1) - determining the limits of the range of possible values of variables.

Probability distributions (step 2) - distribution of probability weights over a range of values.

Correlation conditions - setting relationships for correlated variables.

Modeling - generating random scenarios based on established assumptions.

Results analysis - statistical analysis of simulation results.

Analyses and research results.

Evaluation of the significance of the parameters of the regression equation using Fisher's F-test, Student's t-test, and the Darbin-Watson test showed the following results with these variables:

1-table[1]

[1] Prepared by the author based on research.

Data metrics for re-measured X &Y

X	0.125;	0.154;	0.252;	1.2
Y	0.135;	0.154;	1.5;	1.6

We find and analyze the linear regression equations using the following formula: $\hat{y} = ax + b$

2-table[2]

i	1	2	3	4	5	6	7	8
x_i	0	125	0	154	0	252	1	2
y_i	0	135	0	154	1	5	1	6

3.1. According to the data, we will create a table of auxiliary values:

3-table[3]

i	x_i	y_i	$x_i y_i$	x_i^2	y_i^2
1.	0	0	0	0	0
2.	125	135	16875	15625	18225
3.	0	0	0	0	0
4.	154	154	23716	23716	23716
5.	0	1	0	0	1
6.	252	5	1260	63504	25
7.	1	1	1	1	1
8.	2	6	12	4	36
Σ	534	302	41864	102850	42004

We calculate the coefficients a and b of the linear regression equalization $\hat{y} = ax + b$baccording to the known formulas:

[2] Prepared by the author based on research.
[3] Prepared by the author based on research.

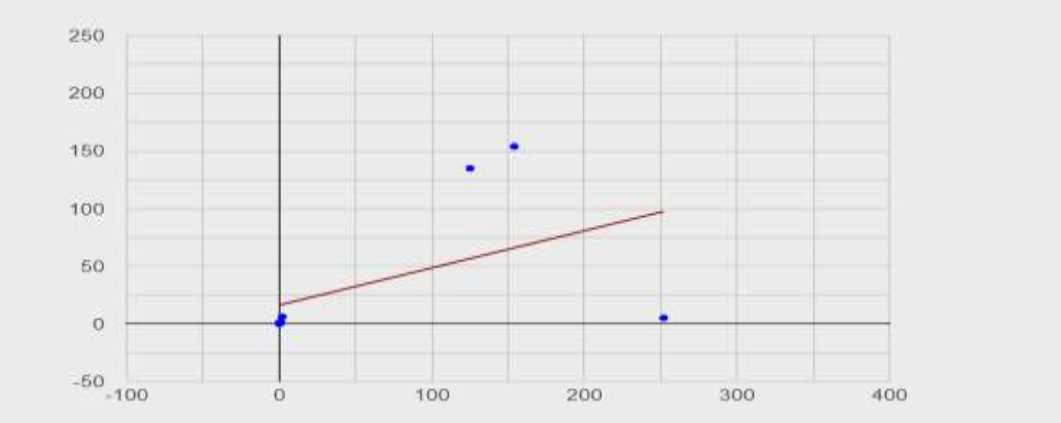
$$a = \frac{\sum x_i \sum y_i - n\sum x_i y_i}{(\sum x_i)^2 - n\sum x_i^2} = \frac{534 * 302 - 8 * 41864}{534^2 - 8 * 102850} \approx 0.323$$

$$b = \frac{\sum x_i \sum x_i y_i - n\sum x_i^2 \sum y_i}{(\sum x_i)^2 - n\sum x_i^2} = \frac{534 * 41864 - 102850 * 302}{534^2 - 8 * 102850} \approx 16.1916$$

So, the desired linear function equation has the following form:

$$\hat{y} = 0{,}323x + 16{,}1916$$

The graphic representation of the study is as follows.



Picture 2. General drawing of the scatter plot and regression equation plot

Analysis of the research data showed a positive result and we can conclude that the project is effective.

Conclusion. When analyzing risks, the reliability of the project is analyzed, which begins with an assessment of the past of entrepreneurs, an analysis of historical results extracted from the company's accounts. Risk analysis is a useful tool that expands the depth of project evaluation and improves the investment decision. Unlike predicting a deterministic estimate, which is almost always refuted by the actual outcome of the project, the probabilistic approach is a methodology that facilitates empirical testing. After assessing the various sources of risk, project risk can be contractually allocated to those parties that are best able to bear and / or manage it. In addition, it allows you to test possible contractual relationships for the sale of products or the purchase of project resources between different parties until a satisfactory project formulation is reached.

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BACHELORS IN THE FIELD OF MECHANIZATION OF AGRICULTURE FUNCTIONAL BLOCKS OF THE PROCESS OF FORMATION OF MANAGEMENT CULTURE

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Annotasiya. Maqolada boshqaruv madaniyatining shakillanishi, funksional bloklari komponentlari, akseologik, kompetensiyaga asoslangan, shaxsiy ijodiy komponetlar, oliy ta'lim muassasalarida qishloq xo‘jaligini mexanizasiyalashtirish bakalavrlarini tayyorlashda ularning boshqaruv madaniyatini shakillanganlik darajasi, bakalavr kadrlar faoliyati, boshqaruvni tashkil etish va boshqaruv madaniyatining shakillanishi yoritilgan.

Kalit so‘zlar: akseologiya, kasbiy kompetensiya, shaxsiy-ijodiy komponent, boshqaruv madaniyati, shart-sharoitlar, madaniyatning shakillanish darajalari.

Аннотация. В статье описаны сформированность управленческой культуры, компоненты функциональных блоков, аксиологический, компетентностный, личностно-творческий компоненты, степень сформированности у них управленческой культуры при подготовке бакалавров механизации сельского хозяйства в высших учебных заведениях, бакалаврская деятельность, организация управления и культура управления.

Ключевые слова: акселерация, профессиональная компетентность, личностно-творческий компонент, культура управления, условия, уровни сформированности культуры.

Abstract. The article describes the formation of management culture, components of functional blocks, axiological, competency-based, personal creative components, the degree of formation of their management culture in the training of bachelors of agricultural mechanization in higher education institutions, bachelor activities, management organization and management culture.

Keywords: acceleology, professional competence, personal-creative component, management culture, conditions, levels of culture formation.

Introduction. The formation of a management culture begins at the pre-professional stage, but the higher education stage is especially important when a systematic formation of professional motivation is carried out, which primarily involves changing the motive towards the goal.

In order to form professional motivation, it is important for a person to “accept” the profession and find the personal meaning of the activity. As a result of the formation of professional motivation, the holistic behavior of the bachelor of agricultural mechanization is formed. The establishment of goals and motivation in the preparation of bachelors of agricultural mechanization should be carried out jointly by the subjects. Thus, in designing the process of forming a culture of management in higher education,

it is necessary to direct the individual, group, team to the formation of a family of goals, motivational support to achieve them. The motivational-target component of the functional block is distinguished by the special importance of motives and goals in management activities and the training of bachelors in agricultural mechanization in the higher education system to implement these activities.

Analysis of the relevant literature. Philosophical, socio-anthropological issues related to the development of culture were studied by A. Begmatov, M. Kakhkharova, A. Mavrulov, J. Tulenov, G. Tulenova, E. Yusupov, O. Gaybullaev. Psychologists M.Davletshin, V.Karimova, A.Leontev, A.Maslow, Z.Nishonova, L.Rubinstein, N.Safaev, E.Gaziev studied the psychological aspects of the problem.

On socio-pedagogical, anthropological and acmeological issues related to the development of culture B. Adizov, R. Djuraev, O. Jamoliddinova, U. Mahkamov, Sh. Mardonov, O. Musurmonova, N. Ortikov, B. Rakhimov, D. Ruzieva, Z. T.Solieva, D.Sharipova, Sh.Sharipov, Sh.Shodmonova, N.Egamberdieva, M.Kuronov conducted scientific researches.

Although research has been conducted by scientists in various fields on the development of professional pedagogical culture of students of higher education institutions, the development of management culture of future bachelors of agricultural mechanization in the context of modernization of the training system has not been studied.

Research methodology. A crucial role in shaping the management culture of bachelors of agricultural mechanization is a holistic pedagogical process that helps to develop their dialectical thinking and is a component of the functional block, which is reflected in the systematic view of management.

The content component is based on the units of the task of educational content - problem situations that reflect professional social and managerial activities in all their subjects and social uncertainty, methods of exposure to social problems, the ability to place the content of education in its dynamics by defining a system of problem situations includes.

Forms of organization of the process of formation of management culture of bachelors of agricultural mechanization are carried out through socially useful activities (volunteering, student self-government, social projects).

The technological component of the functional block involves a set of actions of higher education entities aimed at shaping the management culture of future bachelors. This process is a dynamic process that takes place purposefully in the academic and professional environment of higher education, throughout the student’s entire education period. This process involves the following steps: adaptation-value; formation of competence potential of bachelor's management culture of agricultural mechanization; mastering the unique reflective and creative technologies of management.

The effectiveness of functional blocks is presented in the form of criteria, indicators and levels of formation of the management culture of the future bachelor.

In the theory and practice of pedagogy, there are general requirements for the definition and justification of criteria, focusing on the fact that the criteria should reflect the basic laws of personality formation; they establish connections between all components of

the system under study; quality indicators will have to work together with quantitative indicators.

The proposed system of criteria for assessing the level of formation of management culture, which is reflected in the specific features of future agricultural mechanization frogs, was developed as the author based on the results of theoretical analysis and experimental work and opinions of experts in the field.

The axiological criterion for the formation of the management culture of the future bachelor of agricultural mechanization was determined on the basis of an analysis of concepts of a managerial nature and a previously identified axiological component of the management culture. Axiological criterion is the attitude of agricultural mechanization to management activities, which is reflected in the following set of indicators: understanding and evaluation (assessment) of management goals and objectives in agricultural mechanization work, knowledge of the importance of management knowledge, creative work system (cognitive), subjective recognition of the values of the relationship, job satisfaction (regulation).

Indicators of these criteria were determined in the course of experimental work by finding questionnaires, interviews, individual interviews, satisfaction coefficient and index by the method of V.A. Yadov [1].

Taking into account the functional nature of management activities in the agricultural system, a competency-based criterion for the formation of the management culture of the future bachelor of agricultural mechanization has been developed, reflecting the ability to introduce basic management technologies, implement different levels of management, select appropriate methods and techniques.

This is a management skill, the indicators of which include the ability to perform management activities, the ability to organize joint management activities and self-management. The problems identified in the diagnostic process are managed through a set of skills that reflect the level of development of competence in solving situations.

The personal-creative criterion for the formation of management culture is associated with acmeological ideas about the cultural individual as a culture that has reached the level of culture in accordance with the conditions of modern technical, social and professional life. Performance indicators in management included: focus on specific activities; the level of development of skills in a particular type of activity; education and professional activity as a necessity of self-awareness.

The level of formation of the management culture of the future bachelor of agricultural mechanization is determined in accordance with the following criteria: axiological, competency-based, personal-creative:

First degree (lower). Acceleological component: the student does not understand and evaluate the goals and objectives of management in the work of agricultural mechanization; does not understand the importance of management knowledge in the agricultural system; does not recognize the value of subjective relationships, is not familiar with the values of the future profession. Competence-based component: the student is not familiar with the essence of the processes of self-management, management and co-management, does not have many of the skills necessary to perform management activities at certain levels. Personal and creative component: low focus and participation in education, training and professional, socially useful

activities, low level of development of personal skills for management activities; not participating in social projects or participating in a social project under the guidance of a teacher.

Second (intermediate) level. Acceleological component: the student understands the value of knowledge and skills for self-management, but does not understand their importance for interaction with colleagues and agricultural administration; partially familiar with professional values. Competence-based component: the student has a basic knowledge of the organization of educational activities, the basics of introspection, reflective activity, management features; psychological foundations of self-government; principles of joint management; about ways to build relationships in the social service; have the necessary skills to apply the above knowledge in practice, as well as on the requirements for the preparation of the necessary business documents. Personal and creative component: communicative and organizational skills, infrequent display of business qualities in the process of training, education and professional, socially useful activities; able to develop only elements of a social project.

Third (higher) level. Axiological component: The student understands the value of knowledge and skills in self-management and agricultural management, but does not understand the value of co-management. Competence-based component: the student demonstrates knowledge of methods of self-management, criteria and indicators of successful management of social services, the structure of the analysis of management activities (in addition to those mentioned in the second stage); Psychological bases of self-knowledge, ways to create an "I-concept", to create a favorable socio-psychological environment in the community; about ways to form and develop their competitiveness, communication and leadership skills, business qualities; about the technology of telephone conversations and business correspondence, the nature and characteristics of business disputes, conversations of a conflicting and disciplinary nature, interviews with employees, the technology of meetings, the requirements for record keeping; as well as have the skills and competencies required to carry out activities to apply the indicated knowledge. Personal-creative component: active, developed social projects in certain types of activities are partially implemented in practice.

Fourth (advanced) degree. Axiological component: The student fully understands the value of the system of knowledge and skills in self-management, management and co-management. Competence-based component: the student has the knowledge necessary for self-management, management, joint management activities in agriculture; a wide range of management skills and technologies, applying them in practice. Personal-creative component: active in all types of activities (education, training and professional, professional, socially useful); independently develops and implements a social project, has a positive attitude to personal and professional qualities, and approves performance.

N.V. Tamar defined the levels of the system developed for the diagnosis of the formation of management culture of future bachelors: the first - the culture of management, which is not expressed "subconsciously, involuntarily"; the second is the culture of passive closed management of the “external intermediary transition period”;

the third is a culture of “arbitrary” open governance; the fourth is the "metaculture" culture of sustainable governance.

Analysis and results. It can be said that the first level corresponds to an unexpressed management culture. Characteristics - "unexpressed" reinforces the notion that possession of this feature is not defined and recognized by the subject. The second level described above reflects a culture of passive closed management. Indeed, the existing value orientations and competencies at this level do not allow the subject of higher education to operate freely with management knowledge and skills because the level of ownership is unstable and not fully realized. Value orientations, tertiary competencies allow the student to actively and consciously begin independent work on self-development and the development of a management culture in higher education, and describe an open management culture. The fourth level of shaping the management culture of the Bachelor of Agricultural Mechanization reflects the existence of a process of self-development and active application of its powers, including teaching to other students, making management decisions in a group of students based on internship, leadership qualities, etc. directions.

The results of the experimental research also allowed to identify a number of conditions for the formation of a management culture of future bachelors of agricultural mechanization in higher education:

- Organization of targeted didactic process of gradual formation of management skills in the future bachelor of agricultural mechanization, taking into account the requirements of the state educational standard of higher education in the field of agricultural mechanization, higher education and training in the bachelor's degree. the results of the analysis of pedagogical monitoring of the development of professional competence;
- Integration of theoretical and practical training of students in management activities, the formation of their management culture, which provides for the distribution of modules "Management", "Collaborative Management", "Self-management" in a number of disciplines, as well as internship programs;
- High level of pedagogical culture of professors and teachers, ensuring the interaction of the subject in the process of training in higher education;
- Improving the technological support of bachelor's degree in higher education through the use of active and integrative methods that allow students to demonstrate a culture of management in solving professional problems.

The presentation in the form of a project, defense of student work, conducting, demonstration of creative products allows students to master the form of self-management, countermeasures.

Conclusions and suggestions. Monitoring the process of forming a management culture of future bachelors in agriculture in higher education is based on diagnosing the formation of this culture, allows to predict the prospects of personal and professional development of students and systematically affects the quality of training in higher education.

As a core of management culture, an effective tool influencing the level of formation of management skills is the project activity of students in the process of experimental work. The competence of the future bachelor is formed through the development of

personal education and professional experience that implements his individual creative abilities in project activities during his studies in higher education. By understanding the value system in the design process, the student explores various management phenomena, problematic aspects of management activities at all levels of agriculture, and then implements social projects to address management issues during the internship. During this period, the independence of the project participants is formed, which is reflected in the choice of the project topic, the form of work on it and the final result. In all of this, it gives a special meaning to the knowledge on the research topic, helps students to use their perspectives for business purposes. In this way, they will be able to identify a sense of responsibility in learning, both for themselves and for the student group members. The design allows us to individualize students and combine pairs, groups, and joint work types. At the same time, helping students develop the most appropriate way to act in a particular problematic situation, teamwork, interaction, and enrichment with learning and personal experience.

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THE STRUCTURE AND CONTENT OF THE NEW GENERATION TEXTBOOKS IN HIGHER EDUCATION INSTITUTION IN UZBEKISTAN

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Abstrakt. Maqolada O‘zbekiston oliy ta’lim muassasalari uchun elektron darsliklarning yangi avlodini yaratishda ishtirok etish masalalari muhokama qilinadi. Ta’lim jarayonini modernizatsiya qilish sharoitida o‘quvchilarga chuqur va har tomonlama bilim berish uchun turli axborot-kommunikatsiya texnologiyalaridan foydalanish maqsadga muvofiqdir. Mavzuning jiddiyligini tushunib, ushbu tadqiqot “Zamonaviy darslikni qanday loyihalashimiz kerak?” degan savolga javob berishga harakat qiladi. Tadqiqot savolini o‘rganish maqsadida “Tasviriy san’at va muhandislik grafikasi” va “Texnologik ta’lim” yo‘nalishlari bo‘yicha ikkinchi va kichik kurs talabalari, shuningdek, 2021-yilning yuqori sinf o‘quvchilari o‘rtasida maxsus so‘rovnomalar to‘plami o‘tkazildi. Binobarin, mazkur tadqiqotda elektron darsliklarni yaratishning strategik yo‘nalishi hamda ta’lim jarayonida elektron darsliklarning samaradorligini ta’minlashga xizmat qiladigan vazifalar turlari taklif etilgan.

Kalit so‘zlar: yangi avlod darsligi, elektron darslik, an’anaviy darslik, o‘zgaruvchan topshiriqlar, konstruktiv topshiriqlar.

Abstract. The article discusses the issues of involved in creating a new generation of electronic textbooks for higher education institutions in Uzbekistan. In the context of modernization of the education process, it is expedient to use various information and communication technologies for in-depth and comprehensive education of students. Understanding the gravity of the topic, this study attempts to answer the question “How should we design the modern textbook?” In order to examine the research question a set of special surveys was conducted among sophemors and junior year students, as well as seniors of 2021 in the areas of "Fine Arts and Engineering Graphics" and "Technological Education". Furthermore Consequently, a strategic direction for the creation of electronic textbooks as well as

the types of tasks that serve to ensure the effectiveness of electronic textbooks in the educational process are proposed in this study.

Keywords: new generation textbook, electronic textbook, traditional textbook, variable assignments, constructive assignments.

Аннотация. В статье рассматриваются вопросы создания нового поколения электронных учебников для вузов Узбекистана. В контексте модернизации образовательного процесса важно использовать различные информационные и коммуникационные технологии для углубленного и всестороннего обучения студентов. Понимая серьезность темы, это исследование пытается ответить на вопрос «Как нам разработать современный учебник?» Для изучения вопроса исследования, проведен ряд специальных опросов среди студентов второго и третьего курсов, а также выпускников 2021 года по направлениям «Изобразительное искусство и инженерная графика» и «Технологическое образование». Кроме того, предлагается стратегическое направление создания электронных учебников, а также типы задач, обеспечивающих эффективность электронных учебников в учебном процессе.

Ключевые слова: учебник нового поколения, электронный учебник, традиционный учебник, переменные задания, конструктивные задания.

Introduction. The development trends of modern education are primarily related to systemic changes aimed at creating opportunities for everyone to receive quality education in a comfortable environment (Morze et al., 2014). Providing educational resources with e-learning tools based on modern computer and information technologies contributes substantially to these changes (Harsasi, 2015). Especially in the situation of the recent COVID-19 pandemic, the importance of e-learning tools including e-textbooks, e-textbooks, and e-assignments has increased (Favale et al., 2020). During this period, almost all higher education institutions (HEIs) in Uzbekistan organized distance learning using the Moodle system. Moodle is now aplatform in which all classes are conducted. In a short period of time, all subjects in the bachelor's and master's specialties were transferred to electronic form using the available educational resources, and began to be used in distance learning.

In the short term, the Moodle[4] system was equipped with lectures, practical and seminar sessions on each subject, as well as methodological support for independent learning. These consisted mainly of textbooks, manuals and electronic versions of teaching materials (PDF, DjVu, Word, PowerPoint and such). In addition, video lessons of by leading professors and teachers were also offered as educational resources. Most of the e-textbooks and manuals have been prepared in the form of copying the paper version (book) form to the exact electronic form (PDF, WinDjView, Word, Power Point). Most of these e-textbooks do not include practical work to expand the content and scope of e-textbooks when using computer and information technology.

Literature review. Taking into consideration that the main focus in distance education is on the student's independent learning of educational materials from educational resources, the requirements for the new generation of electronic textbooks will also expand (Alpizar-Chacon & Sosnovsky, 2019).

[4] Moodle is software package which organizes online teaching and online classes

Among the materials prepared for distance learning, it is necessary to emphasize the video lessons conducted by highly qualified teachers (Seidel et al., 2013). It is obvious that just watching and listening to a video lesson does not mean mastering the educational content (Ou et al., 2019). The effectiveness of distance learning often depends on how prepared students are to use information resources properly (Adiyarta et al., 2018). Therefore, first of all, the main task is to create a didactic basis for textbooks (Khutorskoi, 2006) that will serve as a basic educational tool (Shershneva et al., 2016). Secondly, the matter of convenience for students to learn independently is also important factor in terms of meeting the requirements of distance learning (Bringman-Rodenbarger & Hortsch, 2020). Of course, such contexts of e-learning can provide the organization with proper educational environment (Cheng et al., 2012).

E-textbooks that meet modern requirements are important in distance education (Vorotnykova, 2019). At present, the meaning of the term "electronic textbook" is interpreted differently in different sources (Chen et al., 2012). In some cases, the electronic version of the paper version textbook (Shepperd et al., 2008) is understood; in other cases it the term is understood as a complex software of electronic devices, including multimedia materials that teach students non-text, interactive knowledge testing blocks (Zmazek et al., 2012). Here we take a look at some of the e-textbook definitions.

E-learning literature – is a resource capable of collecting, describing, updating, storing information, presenting and controlling knowledge in an interactive way based on modern information technologies which lead to the heart of the class instructor's interaction with the e-materials (Gueudet et al., 2016).

Shirshov (2017) describes the e-textbook as follows, focusing on its main components: "It is a software tool for education that serves to master a training course or a large part of it independently or with the help of a teacher using a computer. The e-textbook consists of three components: *the information transmitter* – to reflect the learning materials; *practical* – to perform tasks that serve to strengthen the acquired knowledge; *diagnostic* – to control knowledge. Additional or expanded components (a large-scale glossary, or a powerful search system) can be added to the e-textbook ".

In later sources, the e-textbook is considered as an electronic publication containing structured information of scientific or practical nature on a specific subject, as well as an educational tool for students with a certain level of training, described in a format that is easy to learn and teach online (Dobler, 2015).

Another description of the e-textbook also repeats the prototype as the e-textbook is here the electronic version (Internet or CDROM version) of the textbook in print (paper) version; and it is also described as an enhanced manual with the options which serves to monitor the theoretical parts with hypertext, multimedia tools of visual aids and the implementation of practical and control tasks (Jao et al., 2005).

This means that a modern electronic textbook should be prepared according to the curriculum of the subject, covering the subject, its sections, parts, and include materials to use in the main links of the didactic cycle of the educational process.

Methodology. In order to determine what the didactic characteristics of an e-textbook should be, we attempted to collect opinions of students about modern

textbooks. For generating data about the student perspectives we used a surveying method. The survey was aimed at determining the requirements for the structure and content of textbooks. It was conducted in February of 2021 among sophomore and junior students of three renowned universities in the region. They are Urgench State University (94 students), Tashkent State Pedagogical University (68 students) and Samarkand State University (30 students). The survey was completed by undergraduate students of "Fine Arts and Engineering Graphics", "Labor Education" and "Technological Education", in order to determine whether their requirements for the new generation textbooks for students studying different departments and disciplines would deviate from one another. The new generation textbooks have been widely introduced and it is important to know how the attitude by students of higher education institutions from different regions of the country.

While building the question list, we tried our best to cover all the aspects and to be inclusive as much as possible in order to generate clear opinions. The main target of the questions is exploring the students' stance in assembling a bunch of answers for creating a perfect e-textbook. The answer sheet to the multiple choice questions ranges – from A to D, each of these indicating an opinion about the given query. Students were asked to answer the questions and selecting 1 or 2 choices which correspond to their opinions. Considering the limits of the answer range, students were encouraged to write on the blanks if they have a mismatched perspective.

Table 1. The amount of selected answers to the survey questions of "How do you imagine a future textbook?"

1. What kind of textbook would you like to use?
A. Textbook (traditional textbooks in schools and universities)
B. A textbook that can be read on a tablet (smartphone)
C. A textbook with animated illustrations
D. A textbook that allows you to perform - certain actions (drawing, explaining the description of objects)
2. In what situations will it be easier for you to master the study material?
A. Making comments in the special spaces left on the page, while reading the textbook
B. Marking the necessary parts, while reading the textbook on your tablet
C. Learning details (audio, video, animation) or additional information using a flash player, reading text on a tablet
D. Textbooks in which all information on the tablet is placed in the form of large-scale interactive images (illustrations) and the required ones can be opened by merely clicking on them.
3. Would you like to ... ?
A. Collect interesting material for your textbook yourself
B. Prepare a presentation on the prepared text of the topic in the textbook
C. Prepare an interactive, multimedia presentation on the prepared text of the textbook

D. Create your own e-textbook (with text, animation, video, audio, interactive images)
4. What do you dislike about textbooks?
A. Large volume of topic texts
B. Incomprehensible words in the text, difficulty in reading
C. Uninteresting description of the material
D. Complex questions at the end of the topic
5. Would you like if ... in the textbook?
A. You can choose from a variety of assignments (by complexity, content, order, etc.)
B. You can read only those that are interesting to you
C. You can have the opportunity to get the necessary guidance on the subject
D. There are a lot of additional materials (text, video, audio, multimedia, animation) that are optional to read, but can be interesting

Results

The results of the survey are summarized in the following figures. These figures demonstrate the response range to the questions from first to fifth respectively. In the diagram, the blue color makes up the number of answers of "A", while the order goes respectively from A to D which is from blue to yellow.

Figure 1 illustrates the total number of responses to the survey questions which covers combines all three universities and departments. It is easy to comprehend from the data that the, highest response rate was for the first question about the type of the textbook that students would prefer. The majority of the students want textbooks to encompass more explanations of the goals of the class through drawings and certain actions. Another significant number is for the last question. It is clear from the data that, students mostly want the textbooks to have more interesting additional materials and contents such as video, audio and-, multimedia that contribute the perfect absorbance of the topic.

It is clear to understand from the figure that students barely intend the textbooks to include complex questions. Merely 18 students were in favor of such textbook, choosing the fourth option.

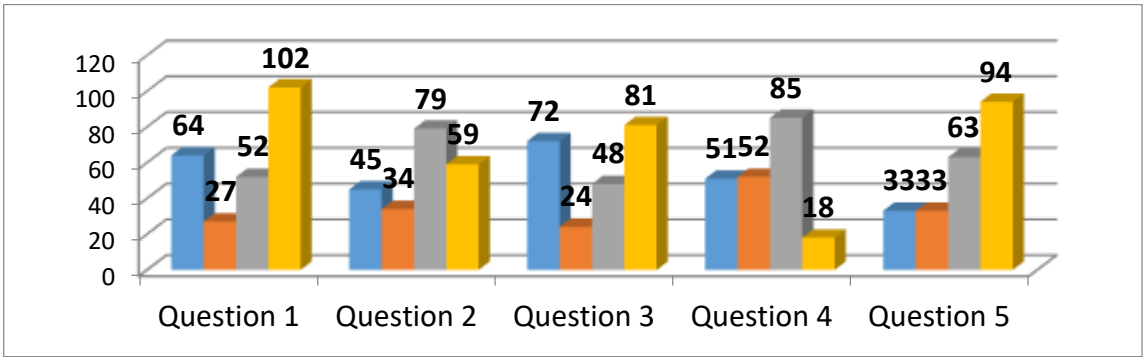

Figure 1. Generalized results of students' answers to the questionnaire In three different educational institutions

Survey questions were conditionally divided according to four purposes:

The first purpose was to determine whether working with electronic or paper textbooks is preferable. The first and second questions belong address this purpose.

The second purpose deals with identifying the preferred characteristics of the learning materials from which students learn. The fourth and fifth questions address this purpose. In this case, the fourth question is related to already available textbooks and allows comparison by rejection.

The third question in the questionnaire, and C and D answer options for the second question, as well as the D option for fifth question, belong to address the third block purpose. They are aimed at determining the readiness of students to acquire independent knowledge in the subject.

The fourth block purpose serves seeks to identify a better way to work with the textbook and the importance of the interactive capabilities of the e-textbook for students. This includes the second and third questions as well as the A, C and D answer options for fifth question.

The results of the survey were broken down as follows:

1. Undergraduate students of "Fine Arts and Engineering Graphics" and "Labor Education" prefer to work with textbooks in paper form. At the same time, students of "Labor Education" (Technological Education) chose traditional textbooks, while students of "Fine Arts and Engineering Graphics" chose textbooks that are rarely used in education with drawing and studying the description of objects. This can be explained, firstly, by the need to pay more attention to the "Workbooks" in the training of future graphics teachers, and secondly, to the fact that the existing traditional textbooks in the Uzbek language do not explain properly the sequence of practical graphic works and images.

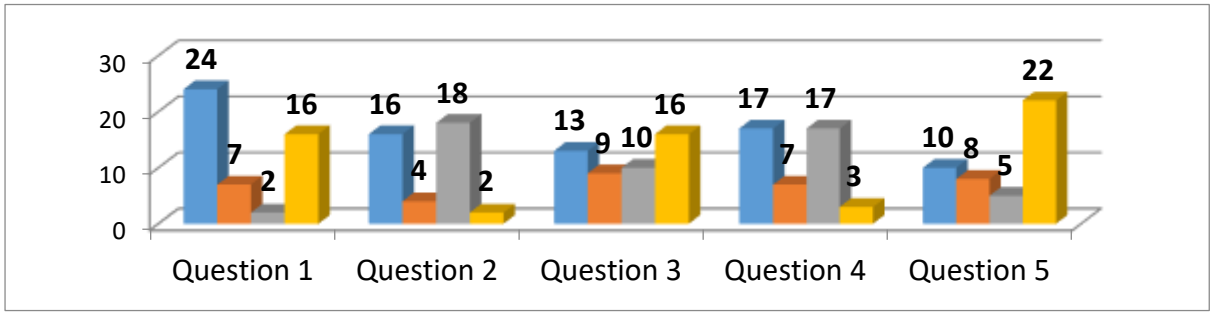

Figure 2. The results of answers to questionnaires of students of Urgench State University

"Labor Education"

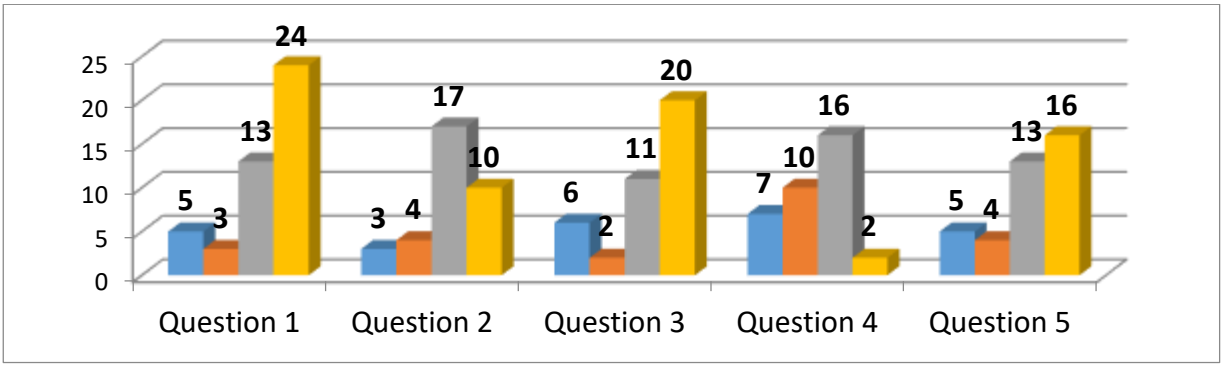

Figure 3. The results of answers to the survey from the department of "Fine Arts and Engineering Graphics", Urgench State University

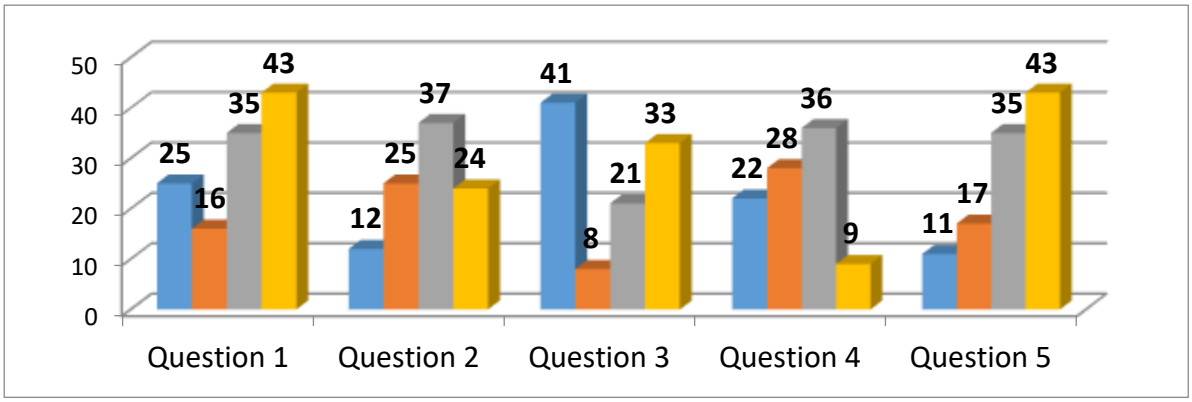

Figure 4. The results of answers to the survey of studentsfrom the department of "Fine Arts and Engineering Graphics", Tashkent State Pedagogical University

However, subsequent interviews revealed that most students made little use of modern information technology during their studies. In the period of preparation for classes, the majority of students used mainly a set of teaching materials on the subject, as well as traditional textbooks or their electronic versions, because these provide all the information they need to prepare for exams. At the same time, students noted: *"Sometimes it is interesting to learn more about the topic and see the details", "Animations in textbooks make it easier to understand the topic", " More attention is paid to the works of artists and illustrations in textbooks of fine arts", "When doing graphic work, students are given the opportunity to choose task options depending on their level of complexity", "More use of creative tasks".*

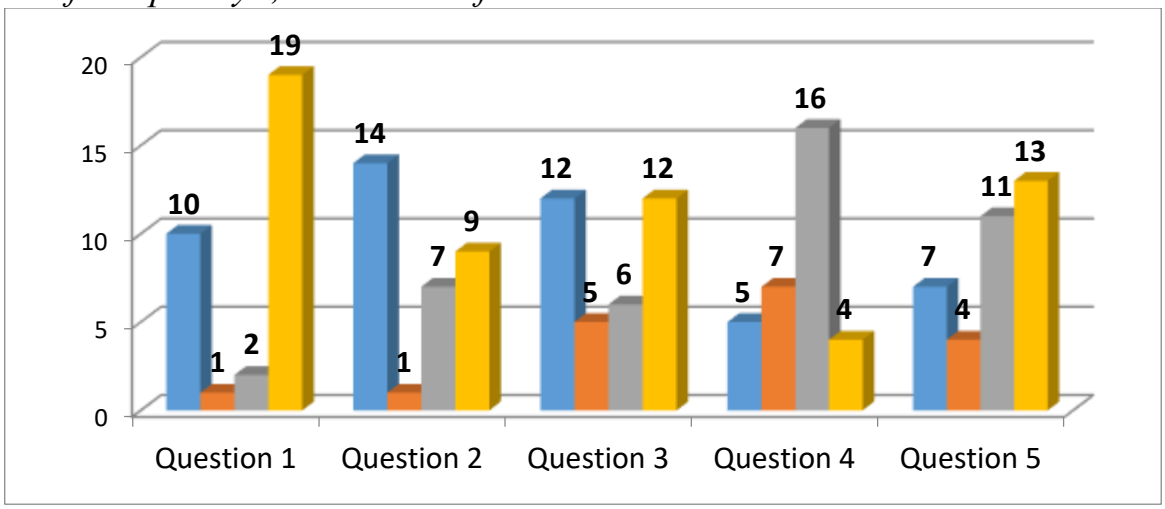

Figure 5. The results of answers to the questionnaire by the students from the department "Fine Arts and Engineering Graphics", Samarkand State University

In the process of completing the assignments, students used information resources only when there were insufficient materials on the topic in traditional textbooks. Their need is mostly addressed to the Internet (information-educational

environment) and ZiyoNet[5] (educational portal) educational resources, where they can easily find ready answers to questions, essays, tables, diagrams, and ready-made materials related to the works and activities. The survey showed that students' information competence in using available e-learning resources is in the process of development. They do not have the skills to "restructure" the information, remove secondary data and select the most important items. It turned out that working with the tablet (as an electronic version of the textbook) with only the content of the textbook with small repetitive concept of the class is one of the forms that barely attracts the users.

The main requirement of students for the textbook is to make it interesting. This requirement applies equally to both, the paper version of the textbook and to the electronic textbook. Many students noted that they were willing to collect additional interesting material for the textbook, and read optional additional interesting materials. Students understand that not all knowledge can be covered in terms of "interest" alone, and that compulsory materials need to be studied so that they can benefit their future careers and lives.

At the same time, the new textbook should be varied, giving the student a choice, instructions, explanations of complex terms "*in simple words, in clear examples*" (dictionary, glossary, appendix). That is, the material in the textbook should not only cover the scientific language, but also correspond to the level of development and knowledge of students.

Another important indicator of the results is that students are ready to work creatively on available materials. They are interested in assembling an electronic textbook (with text, animation, video, audio, interactive images) more independently, collecting interesting materials for these textbook. Preparing presentations on the ready text in the textbook is not so interesting for students of both directions. During the conversation with the students, it became clear that they are interested in collecting additional materials additional for to the existing textbook as additional material in the form of illustrations, pictures, tables and diagrams. However, five of the students, who answered the third question freely, advocated that all knowledge should be briefly covered in the textbook without need for additional information. They stated that they were hesitant about their skills to fully understand the electronic materials. Nevertheless, suggestions for creating an independent electronic textbook and collecting interesting materials for the textbook were preferable for most students. In supporting their choice, they made the following arguments:

- *Everything can be prepared in an understandable way.*
- *Creating the textbook can be interesting but the result might not be the same.*

The information skills of students might not be good enough to fulfill the e-class tasks. It might not always benefit them for their classes to be conducted with electronic textbooks. However, students with the capacity to use electronic tools are ready to work with electronic gadgets. Moreover, they prefer to work with textbooks that allow them to perform certain actions (drawing, opening, zooming, listening, etc.), that is, the

[5] ZiyoNet-is a public information education network in Uzbekistan.

interactivity characteristic of the new generation textbook is important for such students. On the other hand, students who prefer to work with textbooks in the paper version explained their choices as follows: *"You can choose easy-to-use, important and understandable parts, it is clear that there is nothing superfluous, but some places are difficult to understand."*

Discussion

Summarizing the results, it is possible to highlight at least five aspects of the strategy for creating a new generation of textbooks:

- taking into account the specifics of the current direction of educational in the creation of modern textbooks. It is important to include the wider coverage of the stages of practical tasks as well as extensive and appropriate use of practical information and graphics in areas where practical skills are the main point of the class;
- organizing and developing various teaching materials and methods that address the interests and needs of students;
- creating opportunities for students to choose;
- creating conditions for creative and practice-oriented activities by students using a variety of information and communication technologies;
- adding information that is not aimed to distinguish right from wrong but aimed at improving the students' reasoning and logical thinking skills.

In defining and shaping the content of future textbooks, it will be advisable to pay special attention to creating variable assignments for both independent and classroom work of by students. In general, videos (or fragments of them) of lessons and educational activities are can by used as educational resources for such assignments, making it these available on the internet so that students can use the addresses of sites where they can get the exact, detailed information they need such as articles, texts, normative documents and references to them.

For the students in the Department of Fine Arts, assignments on topics related to students' graphic activities (descriptive geometry, engineering graphics) are appropriate if they are in the form of individual options. It is then advisable to build a structure of several levels of complexity. Extensive use of graphic assignments related to design, production and practice, as well as of creative nature, help students to develop practical skills.

Students asked for more attention to be paid in textbooks to the works of fine arts and their analysis in the disciplines related to fine arts. Such illustrations serve to develop students' professional competencies.

Special attention should be paid to tasks that call for the performing of specific educational tasks, and are related to different types of activities. In such tasks, students acquire the skills of independent searching and the selection of the necessary information. Elements related to graphic and visual activities in assignments contribute to the development of the aesthetic tastes and graphic cultures of students. All the factors mentioned above aim at developing future professional activities and skills of students in the area of electronic learning tools.

This study gave some insights by students about how to ensure the implementation of these directions in the creation of a new generation of textbooks. To sum up the survey results of this study, a set of tasks such as graphic tasks related to

the analysis, generalization and systematization of information was developed for the new generation textbook on mechanical drawing and tested in the educational process.

Conclusions. In the recent years, teachers who have been,- trained in higher education institutions of these country, have been preparing e-textbooks, certificates of the textbooks are being obtained, and some have been discussed in coordination councils and recommended to be used in the educational process. These textbooks are used in a narrow range of activities, and in many cases are used only in this particular university. In order to allow enable them to be used in related areas of higher education in the country, it will be necessary for the Ministry of Higher and Secondary Special Education to organize a special site, where a database of electronic textbooks can be created. This will allow users to rate and evaluate the effectiveness of textbooks, and will have provide the opportunity to improve and eliminate shortcomings in e-textbooks.

In creating the e-textbooks, the authors should rely on the activeness of students and their strong desire to learn independently. If these conditions apply, the potential effectiveness of the e-textbook is considered to be high, with its main task serving to educate a person who can use all kinds of educational resources, ready to learn independently throughout life.

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GOVERNMENT REFORMS IN THE FIELD OF PHYSICAL CULTURE AND SPORTS AND THEIR EFFECTS IN UZBEKISTAN

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Annotatsiya. Maqolada jismoniy tarbiya va sport sohasida amalga oshirilgan islohotlar, mustaqillik yillarida davlatimiz tomonidan qabul qilingan qonun va qarorlar o‘rin olgan. Shuningdek, ularni amalga oshirish jarayonida erishilgan yutuqlar va mavjud muammolar muhokama qilinib, ularni bartaraf etish yuzasidan tavsiyalar ishlab chiqilmoqda.

Kalit so'zlar. Mustaqillik, islohotlar, ijtimoiy-iqtisodiy va madaniy taraqqiyot, qonun, qaror, jismoniy tarbiya, sport, ommaviy sport, bolalar sporti, ayollar sporti, jismoniy tarbiya, salomatlik.

Аннотация. В статье приведены реформы в сфере физической культуры и спорта, а также законы и решения, принятые государством за годы независимости. Также обсуждаются достижения в процессе их внедрения и существующие проблемы, даются рекомендации по их устранению.

Ключевые слова. Независимость, реформы, социально-экономическое и культурное развитие, право, решение, физическая культура, спорт, массовый спорт, детский спорт, женский спорт, физическая культура, здоровье.

Abstract. The article contains reforms in the fields of physical culture and sports, as well as the laws and decisions adopted by the state during the years of independence. It also discusses achievements in the process of their implementation and existing problems, making recommendations for their elimination.

Keywords. Independence, reforms, socio-economic and cultural development, law, decision, physical education, sports, mass sports, children's sport, women's sport, physical fitness, health.

Introduction. It is no secret that physical culture and sports play the most important role in the socio-economic and cultural development of any country. That is, they contribute to the development of the country's production and economy by restoring and strengthening people's health and high working capacity. From the earliest days of independence in Uzbekistan, great attention has been paid to physical culture and sports as a key factor in the upbringing of a harmoniously developed generation, and today it is one of the priorities of state policy.

The purpose of the study. Huge reforms have been carried out in Uzbekistan during the years of independence in the fields of physical culture and sports. The purpose and task of our research is to analyze the achievements and positive development that are considered the result of laws and decisions adopted by our state, as well as the challenges we face today.

Research methods. During the research there have been used the analysis and generalization of the literature, pedagogical observation, mathematical, statistical recalculation and other research methods.

Research results and discussion. In order to create a legal framework for physical culture and sports and the successful implementation of physical culture and sports in various sectors of society, as well as to regulate relations in this area, the first law of the former Soviet Union was adopted in Uzbekistan on January 14, 1992. (Article 28).

New amendments were adopted on May 25, 2000 (Article 27) and September 5, 2015 as a result of major changes and reforms in the process of building a democratic society in our country, as well as the implementation of the experience of other foreign countries in the field of physical culture and sports in our country. The final edition was radically different from the previous ones, and Chapter 8 was adopted in an expanded form, consisting of 47 articles. The new version of the adopted law has further strengthened the legal framework and interaction in the fields of physical culture and sports in the country.

It is also important to ensure the implementation of this law; to develop and increase the popularity of physical culture and sports in our country; to restore our national values in the fields of physical culture and sports; to strengthen the health of our people; to form a healthy lifestyle; and to train world-class athletes. In order to ensure the successful participation of our athletes in the Asian and world championships and the Olympic Games, a number of decrees and resolutions of the President of the Republic of Uzbekistan, resolutions of the Cabinet of Ministers of the Republic of Uzbekistan were adopted. From the first years of independence, government decisions have been made in our country on the development of football, tennis, wrestling, and other sports, and these sports have rapidly begun to develop in our country. In 1993, 1996, and 2005, government resolutions were adopted on measures in order to develop football in Uzbekistan.

On September 6, 1998, an unforgettable event took place in the history of Uzbek sport. On the same day, the Uzbek national sport of kurash received the status of "international kurash" and the International Kurash Association (IKA) was established. On February 1, 1999, the Decree of the President of the Republic of Uzbekistan "On measures to support the International Wrestling Association" was adopted. This decree laid the foundation for the rapid development of the national sport of wrestling around the world.

Today wrestling is widely developed in more than 140 countries around the world. Prestigious international tournaments, continental championships, and world championships are being held among men and women. It is also included in the program of the 2018 Asian Games. It is supported in the Presidential Resolutions "On measures to further develop the national sport of Kurash" (October 2, 1917) and "On measures to further develop the national sport of Kurash and further enhance its international prestige." (November 4, 2020).

Resolution No. 271 of May 27, 1999 "On measures to further develop physical culture and sports in Uzbekistan" marked a turning point in the development of physical culture and sports in our country and became a "historic decision" in the history of sports. On the basis of this decision, "a system of three-stage sports competitions" ("Umid Nihollari", "Barkamol Avlod", "Universiada" sports competitions) were introduced in our country, which has never been organized in any other country.

This system has led to unprecedented results in attracting young people to physical culture and sports, forming a healthy lifestyle among them, improving the sports skills of our young athletes, especially in improving urban planning infrastructure in all regions of the country, construction of modern sports facilities.

On October 24, 2002, the Decree of the President of the Republic of Uzbekistan “On the Establishment of the Children's Sports Development Fund in Uzbekistan” was issued and the “Children's Sports Development Fund of Uzbekistan” was established. This fund has become a key reformer in the development of children's sports in Uzbekistan, the creation of sports facilities for children's sports. Modern children's sports complexes and swimming pools of various types have been built in remote villages, district and city centers of Uzbekistan, and great conditions have been created for millions of young people to go in for sports.

During the years of independence, one of the priorities in our country has been the development of women's sports, making sports a part of everyday life, thereby protecting women's health, strengthening women's responsibility for their own health, and ensuring the birth of a healthy generation. On April 16, 2005, the government adopted a resolution “On measures to develop women's sport in Uzbekistan.” According to the resolution, the Uzbek State Institute of Physical Culture has organized a course for the development of women's sports, training highly qualified female coaches and physical education teachers.

Today, there are 27,269 physical education teachers in secondary schools, including 7,763 women, and a total of 10,983 coaches in children's and youth sports schools, including 2,958 female coaches. Another important resolution was the resolution of the Cabinet of Ministers in 2010 "On measures to encourage the work of female sports teachers engaged in children's sports facilities in rural areas".

At the same time, female physical education teachers and coaches working in rural areas will receive a 15% raise bonus for their salaries. At the initiative of the Women's Committee of Uzbekistan, sports competitions "Gymnastics for All", sports competitions under the motto "Father, mother, and me are an athletic family" and "Healthy woman - healthy society" have been organized in the regions of the country since 2005, and women are participating actively.

On June 3, 2017, the Decree of the President of the Republic of Uzbekistan "On measures to further develop physical culture and mass sports in the Republic of Uzbekistan" was adopted. According to the decree, strengthening the material and technical basis of physical culture and sports, construction of modern sports complexes, scientific and methodological support of training, retraining and advanced training institutions, organization of mass sports, holding complex sports competitions, selection of athletes and many other tasks were assigned.

On October 30, 2020, the Decree of the President of the Republic of Uzbekistan "On measures for the widespread introduction of a healthy lifestyle and further development of mass sport" was adopted. The decree stipulates that through regular physical culture and mass sports and the formation of life skills for a healthy lifestyle, every citizen should have a strong immune system against disease, give up bad habits, and follow the principles of proper nutrition, rehabilitation and mass physical activity. The main goal is to create a systematic and effective organization, which includes the creation of appropriate infrastructure and other necessary conditions in this regard.

In particular:

- creation of conditions for physical culture and mass sports in each family, mahalla and district (city), preschool, general, secondary, secondary special, professional and higher education institutions and other organizations;
- regular sports competitions for the development of mass sport among families, classes, labor communities and regions;
- formation of a modern material and technical base for physical culture and sports in preschool, general education, secondary special, professional and higher education institutions, enterprises, organizations and all other types of institutions.

On the basis of this decree, "Health Corridors" were established in the center of each district and city for walking and cycling. Under the motto "5000 steps to a healthy life", health promotion campaigns are being held in all organizations and institutions in all regions of the country. In order to implement this decree, the platform "Healthy Lifestyle" was created, and monetary rewards were given to every citizen who walks 10,000 steps a day

In order to promote a healthy lifestyle among young people, especially among the youth of the neighborhood, competitions are under the motto "Olympiad of Five Initiatives" on the first stage among the mahallas, on the second stage among the district (city) mahallas, and on the third and fourth stages are held among region mahallas.

Conclusion. Because of reforms in the field of physical culture and sports in Uzbekistan, the infrastructure of physical culture and sports in the country has changed radically. The socio-economic, legal, program-normative, and organizational bases of physical culture and sport have been strengthened. Modern sports complexes, stadiums, swimming pools, and tennis courts have been built in accordance with world standards.

Special boarding schools and colleges specialized in Olympic reserves, special boarding schools specialized in different sports have been established in all regions. Our athletes have successfully participated in prestigious international competitions, such as Asian and world championships, the Summer Olympics and the Paralympic Games, spreading the country's fame around the world. Great practical work is being done to develop mass sports.

Despite the reforms carried out by the state in the fields of physical culture and sports, there are a number of problems today. The main problems are:

1. According to the latest scientific sources, 20-25% of the population is involved in mass sports. This is a very low result. This is 60-70% in some developed countries;
2. Physical education and sports have not yet taken a firm place in the daily agenda of citizens or have not become a daily tradition;
3. Despite great efforts to promote physical culture and sport among women, the results are not improving;
4. Adoption of the test requirements "Alpomish and Barchinoy" developed by our state to coordinate the level of physical development of our people is almost not implemented in practice. It should also be noted that most citizens are unable to meet these test requirements. This is due to the lack of regularity in physical education and sports.

The heart of these problems is the lack of a positive outlook on physical education and sports.

Everybody should understand that physical training and sports are as important as water and the air; that movement is a treasure of life; that action can replace any medicine; that in today’s “hypodynamics”, only exercise can meet people’s natural needs for movement; this cannot be achieved unless we create the understanding that physical education and sports shape a person not only physically but also spiritually, and we should know that people live a long life and that physical training and sports are the key to happy life.

To do this, it is necessary to strengthen the advocacy work in the family, neighborhood, educational institutions, and production organizations; to bring the work on the adoption of the test requirements "Physical Education in the Family" and "Alpomish and Barchinoy" to the level of state policy.

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STRUCTURAL - FUNCTIONAL MODEL AND CONTENT OF PROFESSIONAL COMPETENCE OF FUTURE PHYSICAL CULTURE TEACHERS

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Annotatsiya: Ushbu maqolada bo'lg'usi jismoniy madaniyat o'qituvchilarining ilmiy - pedagogik faoliyatini tashkil etish, ularning pedagogik mahoratini oshirish va kasbiy kompetentligini shakllantirish kabi masalalar yoritilgan. Shuningdek, maqolada so'nggi yillarda mamlakatimizda ta'lim sohasidagi o'zgarishar, xususan jismoniy madaniyat o'qituvchilarining kasbiy kompetentligini oshirish xususida so'z boradi.

Kalit so'zlar: ta'lim, tarbiya, pedagogik mahorat, kreativlik, kasbiy kompetentlik, pedagogik ko'nikma, pedagogik malaka.

Аннотация: В данной статье рассматривается организация научно-педагогической деятельности будущих учителей физической культуры, повышение их педагогического мастерства и формирование профессиональной компетентности, а также изменения в сфере образования в нашей стране за последние годы, в частности повышение профессиональной компетентности учителей физической культуры.

Ключевые слова: образование, воспитание, педагогическое мастерство, творчество, профессиональная компетентность, педагогическое мастерство, педагогическая квалификация.

Abstract : This article addresses issues such as the organization of scientific and pedagogical activities of future physical education teachers, improving their

pedagogical skills and the formation of professional competence. The article also discusses the changes in the field of education in our country in recent years, in particular, the increase of professional competence of teachers of physical culture.

Keywords: education, upbringing, pedagogical skills, creativity, professional competence, pedagogical skills, pedagogical qualifications.

Introduction. During the years of independence, our country has considerably risen. Thanks to independence, it has been able to define the prospects of economic, political, social, spiritual and cultural spheres of life, to take a worthy place in the world community and to carry out large-scale reforms to strive to become one of the most developed countries in the world. Studying the experience of developed countries of the world, taking into account local conditions, economic and intellectual resources, reforms are being carried out in all spheres of public life and, as a result, many achievements are being made. In particular, the issue of training future teachers in higher education institutions, the formation of their professional motivation and professional competence, increasing the intellectual potential of future physical education teachers in various specialties, training as highly qualified personnel is also important today. and requires effective reform of the sector.

Literature review. The main purpose of the Law “On Education” adopted for this purpose is to train qualified personnel for the future of our country. As a result of reforms in the field of education, Uzbekistan, in a short period of time, has been recognized by the world's leading experts in the field of education.

Research methodology. In the 21st century, education is recognized worldwide as a key factor in ensuring sustainable development and the concept of international education set by UNESCO until 2030 sets the task of “strengthening and expanding the opportunities for diversity in education and training”[2]. This highlights the need to further improve the readiness of school children to make independent career choices and to use technologies aimed at developing their career choice thinking.

Today, the social order of society in the education system is not primarily aimed at training employees in a particular field (staff), but at training staff with new thinking, special abilities, creative thinking. This is one of the answers of educational institutions in the higher education system to the social order of society. For this reason, all social sciences face a number of pressing issues and tasks for future professionals to find and implement modern teaching technologies aimed at developing professional, pedagogical and vocational guidance skills.

Therefore, an important theoretical and methodological aspect of our research is aimed at increasing the professional and pedagogical training of future physical education teachers, their career motivation, professional competence. After all, the development and growth of any field depends on the activities of a professional who loves his profession and has good knowledge. Therefore, the main purpose and objectives of our research is to form a positive attitude of future physical education teachers to their profession, to strengthen their professional motivation, increase competence, and ultimately to develop the field of physical education.

Of course, the high level of development of any industry will depend on the state's attention to this area, the ongoing reforms and innovations in the development of the industry. In this regard, significant work is being done in our country. In

particular, the Decree of the President of the Republic of Uzbekistan dated January 24, 2020 No. PF-5924 was adopted "On measures to further improve and popularize physical culture and sports in the Republic of Uzbekistan".

On the basis of this document, the Concept "Development of physical culture and sports in the Republic of Uzbekistan until 2025" was developed. The main goal of this Concept is: “to improve the health of the country's population by 2025; strengthening the number of children and youth sports schools and the material and technical base of sports education institutions and increasing the effectiveness of their financial support; increase the total number of citizens, pupils and students who are regularly engaged in physical culture and sports; to increase the weekly movement of the population through the organization of mass sports events; ensuring the successful participation of national sports teams of Uzbekistan in the Olympic and Paralympic Games, world and continental sports competitions; gradual increase in the quality of coaches and specialists in sports education institutions, in particular, the number of employees with higher education; in educating young people and ensuring their employment, such goals as "educational institutions - sports school - higher sports" and the gradual implementation of the system of membership and the process of training and selection of talented young athletes ...”[1]. The focus of public policy on the development of physical culture is to increase the number and competitiveness of personnel in this field, motivate them, as well as play an important role in improving their professional competence.

In studying the process of forming the professional competence of a teacher, in particular a physical education teacher, we need to pay attention to many aspects related to them. First of all, we found it necessary to analyze the essence of the concept of "competence", "competence-based approach", its structure and content. This is because the “Competency-Based Approach,” “Competency-Based Education,” and others together represent a structural-functional model for the formation and development of the professional competence of a future physical education teacher.

Before continuing to reveal the essence and structure of the professional competence of a future physical education teacher, we will in our study elucidate the content of the concept of competence and define the scientific definitions related to it.

There are many definitions and interpretations of the concepts of "competence", "competence", "basic competence", "competency approach", and the idea that they are formed and manifested in practice is widely discussed in all approaches to these concepts. This raises a number of questions. What is Competence and Competency? What qualities are characteristic of professional competency? What qualities of competence should a teacher have? Only when we can find answers to these and similar questions will we be able to fully understand the content of the concept of competence. There are many definitions of the term competence. In particular, this term is explained in the Uzbek dictionary as follows. Competence lot. competere - to be worthy, talented. The scope of authority of a particular body or official established by official documents; authority[3.463]. Also, "Competence" - the ability to effectively use theoretical knowledge in practice, to demonstrate a high level of professionalism, skill and ability[4]. Competence is the ability to apply existing knowledge, skills and competencies in daily activities.

The Director of the Department of Education, Culture and Sport of the Council of Europe, M. Stobart, in his report, reflecting on the competencies, makes the following points:

- Political and social competencies: the ability to take responsibility, participate in joint decision-making, non-violent conflict resolution, participation in the functioning and improvement of democratic institutions);

- competencies related to life in a multi-ethnic society (understanding of differences in the traditions of nations, mutual respect, ability to live with representatives of other cultures, languages, religions);

- competencies related to the emergence of an informed society (for example, the ability to create and master new technologies, understand their application, the ability to critically approach the information and advertising disseminated through the media); - Competencies that enable lifelong learning in the professional field, as well as as a basis for continuous training in private and public life.

Today, the term "competence" is increasingly used to raise education to a new level of quality, to discuss it and to achieve new results. But so far, the pedagogical community is still debating what the competencies are, which of them is the main (important), how to shape them and evaluate them. The concepts of ‘competence’ and ‘competency’ should not be confused with knowledge, skills and qualifications. The concept of "competence" is broader than the concepts of "knowledge", "skills", "ability", and includes components of motivation, ethics, social and behavioral ones. Competence is a constantly evolving phenomenon that is shaped and developed in the learning process in the family, under the influence of the social environment, in the circle of friends, as well as under the influence of religion as a form of social consciousness. It follows that the formation and implementation of competence depends on the whole system in which a person lives and develops: the social, educational, cultural situation.

The meaning of the term competence varies according to the field of science. For example, in the social sphere: Competence is derived from the Latin word **compete**, which means to achieve, to conform, to be proper. At the same time, a certain set of knowledge, skills and abilities acquired by a person is also considered a competence. The word competence is also used in the sense of the authority and right given to an individual or organization to perform a particular task.

According to the definition given in the field of pedagogy, competence is a requirement for the educational training of a specialist, which is necessary for quality work in a particular field. Competence is a pre-determined social requirement at the disposal of the state, which applies to the educational (professional) training required for a student to work effectively in a particular field. In modern pedagogical dictionaries, the concept of competence (Latin competentia - legal affiliation) is understood as the rights and obligations of an official within its powers, and competence is the level of literacy, (in the course of service activities, emphasis added. -Ya.D) is understood to have a sufficient set of knowledge, skills and abilities necessary to achieve[5.216].

From this it can be seen that from a pedagogical point of view, the concept of competence is a set of rights and responsibilities of the teacher, the field of professional

matters that he is authorized to implement during his career. This allows the educational process to be effective as well as to achieve the desired result. "Competence is a set of behavioral competencies"[6].

From a psychological point of view, competence is a complex, educational structure of the individual, which includes a number of individual qualities of the individual (intellectual, volitional, creative, emotional), which ensure the realization of the goal of psychological activity in its changing conditions. Thus, competence is a high qualitative quality of a person, the formation of which is a decisive consequence of education. It appears that these meanings of competence constitute a process related to areas of human activity. For example: social competencies, practical skills, professional competencies, communicative competencies, etc.

When translated from Latin, (competentia) refers to a range of issues that a person is familiar with, has knowledge and experience. V.V.Kraevsky and A.V.Khutorskoys - writes, competence in a particular field - is the ability to rationally assess the field and acquire relevant knowledge and skills that will allow it to act effectively in it[7]. Bashev, on the other hand, says that competence is the formation of an individual's ability from the context in which it arises (i.e., the lower stage of formation), to the stage of creative thinking, intellectual development, the individual's ability to express a specific attitude to a social situation. Abilities are manifested when conditions change and this ability is transferred to other conditions. The scope gives it uniqueness and clarity (e.g., mathematical, linguistic, political, and other competencies).

Most scholars consider competence to be the ability to determine the relationship between knowledge and situation, and to apply knowledge and skills in problem solving. In other words, a qualification is a skill, it causes action and experience. According to Russian Scientist V.A.Bolotov, a competency-based approach is associated with the formation of the teacher's ability to act effectively in unusual situations in education and what is mastered in the educational process. For this reason, in the transition to competency-based education, it is important not to neglect the basics of science, knowledge and skills acquired in the field of education.

Analysis of competence in terms of readiness for pedagogical activity shows that competence is a teacher who is well aware of the secrets of his profession, knowledge of the field, and is ready to perform this activity on the basis of a new approach.

Also, S.E.Shishov and V.A.Kalneys have introduced the following concept of competence into pedagogy: knowledge, experience, values, and consider the ability to make connections between general ability, knowledge, and situation based on knowledge acquired through learning. According to them, “competence is not an ability that can be manifested in any situation, but rather it is based on certain knowledge and experience” (S.E.Shishov, V. A.Kalney, 1995). From these considerations it can be concluded that competence is the pursuit of excellence in a particular profession, which is formed on the basis of certain knowledge and experience.

The introduction of the concepts of "competence" and "competence" in the field of pedagogy (education) is associated with psychological research. From a psychological point of view, competence can be understood as the ability of a teacher

(specialist) to behave in complex situations, unexpected situations, to correctly assess the situation, to adapt, to communicate and to have a clear plan of action in unexpected situations and processes.

L.M.Dolgova defines competence as the ability to act on the basis of acquired knowledge. Unlike modern teaching methods, competence implies the experience of independent activity based on universal knowledge. Competence is the availability of knowledge and skills in the form of social practice, which is reflected in the socio-cultural requirements for the results of educational work.

Today, in the field of pedagogy, the term "competence" is increasingly used to raise the quality of education to a new level, to discuss the results. At the same time, in the field of pedagogy, discussions are currently underway to specify what competencies are most important (universal) in the educational process, and what are the methods of their formation and evaluation. Based on the above considerations, it can be said that “competence” and “competence” are concepts that are close in content and essence, and that these concepts should not contradict knowledge, skills, and abilities, but rather the ability to be formed through them.

To date, a number of studies have directly analyzed the issue of professional competence of the educator and studied its specific aspects. Such research works were developed by A.K.Markova and B.Nazarova. In her research, A. K.Markova analyzes the professional competence of the teacher and shows that it is based on the following components. They are following: Special or professional competence, social competence, personal competence, individual competence, and so on[8]. He explains these concepts of competence, special or professional competence (organization of professional activity at a high level), social competence, joint organization of professional activity), personal competence (self-development), individual competence (self-management, professional self-reliance), self-expression, development and innovation).

One of the Uzbek scientists, B.Nazarova, studies the specific aspects of professional competence of teachers based on national characteristics, and the research studied by them is of particular importance. In contrast to Markova, in her opinion, the basis of professional competence specific to a teacher is a special or professional competence, in addition to social competence, auto-competence, extreme professional competence (i.e ability to work in unexpected situations, self-development).

In the field of specific competency (especially in pedagogical activities, in particular, it is related to the occupational education of the conspiracy of the Pedagogical activity: Scientists of the Competence (important and special) are required by scientists, these competencies are needed to divide these competencies into three important groups. They are:

The base competence is competencies that are much wide, the field of application is much wide, which is conform to many profits and in all professions;

The competent of generally advocacy is - competencies that make up the basics of the main types of professional activity;

Vocational special competitions - specific competencies specific to the basic competencies necessary for the implementation of certain professional activities. They

are "a certain professional and make up part of the variable composition of professional competence"[9.255].

The changes and updates performed in today's education are in particular to develop a scientific concept of the professional competence of the forthcoming physical culture specialist. In this part, this part of the dissertation we relied on the following principles, which is a methodological nature, based on the established tasks:

- formation of socio-economic active person, where social relations are accessible;

-in order to form and develop vocational and pedagogical directions, a complex, multifaceted effect;

- an improvement of the person's development of perfection, a new treatment of social and pedagogical activities;

- dependence on a number of factors of formation of professional and pedagogical competencies (such as skills, skills);

- higher quality based on the Concept of society, the state and the government and the civil, the harmony between school and social life;

- the principle is the principle of the scientific nature of higher education. At this stage, the professional competence is equally formed.

These methodological principles must serve as a clear guideline in the design of the professional competence of the future physical education teacher.

The above is to say that the professional competence of the pedagogy and psychology does not have a single view of students' knowledge and mind, the essence of professional age. K.Ya.Amina, A.A.Verbitsky, N.S.Rozov, I.I.Shaaevs The professional competence said that this is the combination of understanding of social experience and knowledge previously obtained as a result of professional activities and others. The integrative development approach was used by the professional competence, various researchers in various sense. "The necessary measure of the professional competence is a condition of professionalization, and the effectiveness of professionalism, as a purpose and outcome of professional education". This approach is very innovative for competence. Many researchers react to the competence from pedagogical point of view. The term "Competence" is a certain certified right to belong to a particular profession, as a special form of cognitive and practical activity through knowledge and experience of the person in any field of knowledge.

Socio-economic developments in society, entry into a market economy, reflect the development trends in the achievement of each intelligence, including the future teacher. The professional computer of the future physical education we understand coverage of an integral quality of the teacher, including personal, professional, communicative features; second, the higher education institution, as well as in the field of physical culture, will be taken up to the level of professional knowledge, skills and activities to the teacher, as well as professionalism. In the activities, it helps the person self-development and self-improvement.

The diversity of the concept of the competence has not yet been able to reach a uniform conference on competitive competitors. But many scholars have shown that the competence is "It can be thought about the existence or absence of competence outside the activities," they said[10. 138-144]. Another point of view is associated with

understanding the competence as its general and readiness to professional knowledge and experience[11. 23-30]. It is clear that the professional competence of the future physical education teacher is the ability to identify the situation in its pedagogical activity and to act in accordance with knowledge and experience.

The professional competence is not limited to a high level of knowledge and experience, but also provides personal responsibility for the behavior in the process of performing their professional duties, the formation of responsibility. "The composition of the professional competence shows that it consists of its motivation, cognitive and emotional components. It is manifested"[12. 36-41].

The scientific competence concept is given in scientific psychological and pedagogical literature as follows:

- generalized methods of knowledge, skills, skill, professional activities, the characteristics involving personal and professional qualities[13. 384];
- component characteristics consisting of motivation, cognitive, emotional components[14. 20-26];
- integral characteristics, the sum of the competent integration quality[15. 304];
- characteristics of the person - the ability to carry out activities and readiness [16. 529].

The above authors can summarize the opinions - competitive competence, representatives of the teacher, consisting of personal and professional characteristics, are capable of exercising and professionalism to exercise their professional activities effectively. Any competence includes generalized general methods formed and developed in the implementation of unique knowledge, skills, skill, vocational activity.

Conclusions and recommendations. It is known that the structural element of the Occupational Competence is the creative self-development, the modern concept of its modern controversy is based on a new paradigm. Of course, the priority of modern education should be a education aimed at personal self-development. This new pedagogical paradigm is based on the following postulates:

-understanding the inner values of every person;
- unlimited opportunities for each person's development;
- understanding the nature of the creative self-development as an integral character of "self." Components forming this system: self-knowledge, creative self-determination, self-government, such as self-government, the person's creative self-awareness of the person. In this process, a person becomes a stage of self-sufficiency in the state of self-discipline and development.

Based on the above considerations, the following paragraph called “Structural-functional model and content of professional competence of future physical culture teachers” can be concluded as follows:

Firstly, the competence is a complex synthesis of cognitive, practical and personal experience, which is a system of personal and professional characteristics, which is manifested in pedagogical activities, is the ability to effectively implement the professional activities of the teacher. It includes a complex and widely capacity building that combines professional, social-pedagogical, socio-psychological, legal and other features.

Second, the general criterion of professional competence is the results of the work of the specialist, the social significance of his work, his reputation, the state of social work in a particular field of knowledge, it is therefore important and necessary to develop a scientific concept of the formation of professional competence in each professional (future physical culture specialist).

Third, the formation of the professional compensation of the future physical culture teacher is based on a number of principles, and these methodological principles will serve as clear instructions in the formation of professional competence of the future physical culture teacher.

Fourth, each of the functional components has its own characteristics and raises a unique "burden" in the activities of the participants of the pedagogical process. The insulation of structural and functional components contributes to the unique approach to the organization and management of pedagogical phenomena, which will allow pedagogical systems, students, their parents, the most general patterns specific to managers.

Fifth, the education system we are implementing is humanized education, which focuses on the interests of the individual student as a process of education renewal, including the “humanization” of education in terms of content. As a result, it is the basis for the development of a mature specialist who is perfect in all respects and has his own personal opinion.

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ELEMENTS OF FAIRY TALES

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Annotatsiya : Ushbu maqolada ingliz ertaklarining o'ziga xos xususiyatlari va ulardagi turli elementlar haqida so'z yuritiladi. Shuningdek, ingliz ertaklarining umumiy va xususiy jihatlari yoritib, ulardagi asosiy obrazlarning xarakter xususiyatlari tahlil qilinadi.

Kalit so'zlar : saxiylik, ruhiy rivojlanish, mukammallik, folklor, ertaklar, millat, janrlar, rivoyat, madaniyat

Abstract: This article discusses the peculiarities of English fairy tales and their various elements. It also sheds light on the general and specific aspects of English fairy tales and analyzes the character traits of the main characters in them.

Keywords: generosity, spiritual development, perfection, folklore, fairy tales, nation, genres, legend, culture

Аннотация: В данной статье рассматриваются особенности английских сказок и их различных элементов. Также проливает свет на общие и специфические аспекты английских сказок и анализирует черты характера главных героев в них.

Ключевые слова: щедрость, духовное развитие, совершенство, фольклор, сказки, народ, жанры, предание, культура.

Introduction. Fairy tales will often include a moral message for the reader. All fairy tales need a good character, they don't need to be perfect but the reader must like them. You will be able to think of lots of 'good' characters - Cinderella, Snow White, The Ugly Duckling; think of any fairy tale and you should be able to identify a 'good' character.

A good character will typically start off as young, often poor and alone, unhappy, humble and untainted. They generally turn out to be respected and to have found power and happiness.

Research Methodology. The bad character (witch, a goblin, a dragon or an ogre) acts as an antagonist to the good character and they usually have evil powers which are used to cause the good character pain.

These may include:

- a task-setter (this may be a king, for example)
- other accomplices (these may include talking animals)

- adversaries (such as an evil step-mother)
- the character that the hero has to rescue and release from a spell

Many fairy tales have both good and evil magical characters that work to offset the other's influence.

There are oftentimes also magic numbers. The numbers three and seven are very special and fairy stories wouldn't be the same without them. There are plenty of examples of these numbers being used in fairy tales - 3 little pigs, 7 dwarves, 3 fairy godmothers, 3 wishes, 7 mermaid sisters, 3 bears.

The basic structure of a fairy tale involves a hero or heroine performing one or more tasks and then being rewarded as a result. The obstacle usually appears to be insurmountable but with a bit of creativity and some magical assistance a solution can be found. The obstacle may be overcome by their 'good' qualities, such as courage, cunning or goodness, by timely intervention of an accomplice with magical powers or by using a magical object.

Admittedly, the study did not focus on whether men or women were more "important"—the lesson my four-year-old friend had somehow learned—but the researcher's findings certainly suggest that fairy tales reinforce many gender, racial, and socio-economic stereotypes.

Analysis and Results. In order to understand where the sexist tropes we see in the media come from, it helps to take a look at one of the most influential roots of Western stories: Fairy tales. Many of the gender tropes found in the fairy tales of the olden times have made their way into modern children's books, family movies, and even romantic comedies. These conventions can be easy to take for granted because they're all around us, but when you look at their origins, they're actually quite disturbing.

Fairy tails are really complicated and fascinating from a feminist perspective. A lot of them have female protagonists and explore issues specifically faced by women during the times when they were written, like marriage and familial relationships. As Anne Thériault points out in The Toast, it's likely that a lot of fairy tale publishers got their inspiration from folklore related by women. However, the fact that something was created by a woman doesn't absolve it from being sexist, especially when it was written during a time when women had few rights. And it's easy for tales to get twisted over time and glorify things that were initially presented in a negative light.

Here are a few of the gender tropes seen in the fairy tales of old that still affect the stories we hear today.

1. The Motherless Girl

What do Cinderella, Belle, Ariel, and Jasmine all have in common? They don't have mothers. And as Sarah Boxer points out in The Atlantic, many non-fairy-tale-based movies also employ the trope of the "gone or useless" mother. She cites Mrs. Doubtfire and The Man Without a Face; additionally, I also noticed the trope of the dead mother driving the plot in the recent horror film Crimson Peak. Boxer theorizes that the death of fictional mothers contains elements of misogyny, serving to split women into two (the "good" dead mother and the "evil" stepmother) in fairy tales and to glorify fathers in modern-day stories. Whatever the reason, this plot line gives off the impression that a mother's role in a child's life is unworthy of mention.

2. The Evil Stepmother/Stepsisters

The main characters of fairy tales are often not only without mothers, but also without supportive women to turn to, period. Instead, female fairy tale characters are in competition, whether for things like the prince in "Cinderella" or the title of "fairest of them all" in "Snow White." This trope implies that women are a threat to one another and men are the only people who can offer anything positive to a woman's life. As author Chimamanda Ngozi Adichie says in the TED Talk "We Should All Be Feminists," "We raise girls to see each other as competitors — not for jobs or for accomplishments, which I think can be a good thing, but for the attention of men." And fairy tales don't usually help that.

3. The Knight In Shining Armor

One problematic aspect of fairy tales that's frequently discussed is their focus on a woman's longing to be rescued from her lonely life by a man. Fairy tales like "Cinderella" and "Rapunzel" end when a man saves a woman from her uneventful single life, which can encourage the girls hearing these stories to believe that the way to find happiness is to find and marry a high-status, conventionally attractive, masculine man like the princes they've read about in stories or seen in movies.

4. The Evil Witch

As seen in fairy tales like "Hansel and Gretel," "Snow White," and "Sleeping Beauty," the trope of the evil witch smacks of both sexism and ageism. The stigmatization of witches historically has roots in misogyny; many historians have argued that the witch hunts of the 16th and 17th centuries targeted women in particular for being independent and forming spiritualties free from patriarchal religions. In addition, the witch is usually an old woman, suggesting that all a woman can be as she ages is a jealous adversary who lives all alone in the woods. Like the evil stepmom and stepsisters, the evil witch trope pits women against one another and leaves them to rely on men for all positive relationships, neglecting all the ways women — especially older

In order to understand where the sexist tropes we see in the media come from, it helps to take a look at one of the most influential roots of Western stories: Fairy tales. Many of the sexist tropes found in the fairy tales of ye olden times have made their way into modern children's books, family movies, and even romantic comedies. These conventions can be easy to take for granted because they're all around us, but when you look at their origins, they're actually quite disturbing.

Conclusion. Fairy tails are really complicated and fascinating from a feminist perspective. A lot of them have female protagonists and explore issues specifically faced by women during the times when they were written, like marriage and familial relationships. As Anne Thériault points out in The Toast, it's likely that a lot of fairy tale publishers got their inspiration from folklore related by women. However, the fact that something was created by a woman doesn't absolve it from being sexist, especially when it was written during a time when women had few rights. And it's easy for tales to get twisted over time and glorify things that were initially presented in a negative light.

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THE PRAGMATIC PECULIARITIES OF THE ENGLISH CONTEXT AND POTENTIAL SHIFTS STEPPED FORWARD REGARDING THE MEANING

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Annotatsiya. Pragmatika sohasini ko'pchilik tilshunoslar faylasuflar ilgari surilgan va potezalarni isbotlash zarurati mavjud bo'lgan soha sifatida qabul qiladi. Ush tadqiqot tadqiqot shuni ko'rsatadiki,.ko'pgina eksperimental pragmatik farda uzoq vaqt davom etayotganaz "pragmatik" lingvistik qayta ishlashning vaqtinchalik emas, tor ma'noda inferensial bo'lgan tomonlarganda de fikirutadi. Lingvistik kodlash/dekodlash jarayonlari bunga yaqqol misol. Gap hosil bo'lganda, birinchi tovushlar va tovush birikmalari qayd va undan keyin semantik tahlil bilan birga sintaktika tugallanadi. Grammatika diqqatning keyingi bosqichda so'zlar bir-biri bilan uyg'unlashada boshqa amalga oshirish. Pragmatik tahlilting bosqich bo'lib, talqinni to'liq anglaydilar. yuqori maqolada yuqorida qayd qilinib o'tilgan barcha pragmatik detallarni ishlab chiqarish va misollar bilan boyitadi.

Kalit so'zlar: Pragmatika, gipotez, pragmatik, lingvistik kodlash/dekodlash, grammatika, pragmatik detallar

Аннотация. Область прагматики воспринимается большинством лингвистов как область, где есть необходимость доказывать случаи и гипотезы, выдвигаемые философами. Результаты этого исследования показывают, что давнее предположение во многих экспериментальных исследованиях прагматики состоит в том, что «прагматика» относится к аспектам лингвистической обработки, которые являются скорее выводными, чем временными. Хорошим примером этого являются процессы лингвистического

кодирования/декодирования. При формировании предложения записываются первые звуки и звукосочетания, а затем выполняется синтаксис вместе с семантическим анализом. Грамматика делается на следующем этапе внимания, когда слова начинают сочетаться друг с другом. Прагматический анализ является заключительным этапом, на котором слушатели могут полностью понять интерпретацию. В следующей статье представлены все вышеупомянутые прагматические детали и обогащены примерами.

Ключевые слова: прагматика, гипотеза, прагматические исследования, лингвистическое кодирование/декодирование, грамматика, прагматические детали.

Abstract. The field of pragmatics is perceived by most linguists as a field where there is a need to prove the cases and hypotheses put forward by philosophers. The results of this study show that a long-standing assumption in much experimental pragmatics research is that "pragmatics" refers to aspects of linguistic processing that are narrowly inferential rather than temporal. Linguistic encoding/decoding processes are a good example of this. When a sentence is formed, the first sounds and sound combinations are recorded, and then syntax is completed along with semantic analysis. Grammar is done in the next stage of attention when the words start to fit together. Pragmatic analysis is the last stage, where the listeners can fully understand the interpretation. The following article provides all the above-mentioned pragmatic details and enriches them with examples.

Keywords: Pragmatics, hypothesis, pragmatic studies, linguistic encoding/decoding, grammar, pragmatic details

Introduction. Pragmatics is correlated with a context and delivers what the aforementioned is going to code you. In accordance with the context, the types of pragmatics fall for a range of categories. What matters a lot at this stage is to take the sorts of the context into consideration, as well. As Leclercq Benoit cited in the article “Semantics and pragmatics in Construction Grammar”, Belgian Journal of Linguistics, 34, there are several notions that should be taken into consideration. Context sensitive is the term applied to refer to a group of words as well as phrases used in the utterance

Research methodology. Context dependence is what is stated to mean all this context sensitive expresses. According to Bach, a linguist expert, the overall gist of the context can not vary the meaning of context sensitive. It is what context sensitive changes in whole. The words which are apart from their dictionary meaning can stand for another which can change the topic of the utterance produced.

Bach gives the thorough information in terms of the types of the contextual information.

He stated that the narrow contextual information which is marked as the first type lasts shorter and the prominent focus is directed to two groups of the context:

1. Listener and Speaker
2. The time and the place

The narrow context’s scope (size) is not in wide range but only concentrates on the message the speaker is generating.

Analysis and results. While the narrow context does not usually require the proceeds of decoding the implicated speech, the broad contextual information- the

second on its type, gives a chance to the addresser to buy some time to think of what the speaker is going to express. To comprehend the message, the listener takes all the things into consideration.

So, here we can drop the information that a word has two things loaded on it:

1. The meaning in the context
2. Contextual meaning

The former can speak about the form of a word, the part of speech it is coming as, the first donation that it appears within the dictionary.

Contextual meaning which has the same form but can offer the different part of speech, getting treasure of either totally different meaning or new but original-related one. In both cases, the word will be same in the form but different in the meaning or changed by a speaker.

The meaning in the context usually is gifted with the grammatical features of linguistics which add the grammatical atmosphere whilst contextual meaning usually work with the words or utterances.

“The context is not what is said or meant” (Bach)

The context is what is understood by the listener.

Contextual meaning is a more functional notion that captures that status of the information that is communicated in context: it captures a range of meaning effects that share, as a common denominator, the fact that they are determined in the context(be it the linguistic or non-linguistic context)

Conclusion/Recommendations. As Beniot told above that the meaning which is the result of pragmatics has a function besides its grammar responsibility as well as the first denotation. It can change the whole topic of the speech and the atmosphere there. That’s why we should confuse the synonyms of a particular word with the contextual meaning where their synonym is jus another way of referring the dictionary meaning and the letter can go far than its first reference.

According to the articles composed, there exist a range of types of contextual meaning:

1. Context-independent semantics(truth-conditional meaning)
2. In-context-determined facets of truth-conditional meaning(context-dependent)
3. In-context-determined facets of non-truth conditional meaning(context-dependent)- pragmatics.

They live far from home- there is not any implicit of the utterance.

He is wearing a rabbit.

He is wearing clothes made from the leather of a rabbit(in-context-determined facets of truth-conditional meaning)

It is quite noisy here.

The speaker is implying the listener to close the door.

By the aforementioned notions stepped forward above, one can conclude there can exist a range of factors which should be taken into consideration while analyzing the peculiar features of pragmatics utilized and put forward by the speaker and receiver so as to be coded and decoded correctly as well as sensibly.

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THE ACCOUNT OF THE ARGUMENTS ARISEN BY EXPERTS IN TERMS OF PRAGMATICS IN THE EARLY YEARS OF THE DEVELOPMENT

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Annotatsiya. Pragmatika sohasi bugungi kunga kelib, ko'p tarmoqlarda uchrashi mumkin bo'lgan va aynan, lingvistikaning yangi til bo'limi sifatida ko'pchilik mutaxassis va ekspertlarning qiziqishiga sabab bo'layotgan soha hisoblanadi. Dastlab, falsafa dunyosining bir bo'lagi pragmatika 1970-yillarga kelib lingvistikaning ham mustaqil bo'limi qatoridan joy oldi va hozirda o'zining ko'lamini faqatgina tilshunoslikda emas, balki psixo-lingvistikada ham ko'pgina munozaralarga sabab bo'lmoqda. 20-asr o'rtalarida falsafadan ajralib chiqqan bo'lsa ham, pragmatikaning rivojlanishiga ko'pgina olimlar qarshilik bildirishgan. Buning asosiy sababi, pragmatikaning matn mazmuniga qarab o'zgarishi va aniqlilikning kamliidir. Quyida keltirilgan maqola aynan pragmatika vujudga kelgan davridagi masalalar va mutaxassilarning pragmatika rivoji bo'yicha keltirgan fikr-mulohazalar haqida batafsil ma'lumot beradi

Kalit so'zlar: Pragmatika, lingvistika, tilshunoslik, psixo-lingvistika, aniqlilik, davr, fikr-mulohaza.

Аннотация. Прагматики по-прежнему остается которая сегодня встречается во многих областях и представляет интерес для многих специалистов и экспертов как новая языковая отрасль языкознания.

Первоначально являясь частью философского мира, прагматика стала самостоятельной отраслью лингвистики в 1970-х годах и в настоящее время является предметом многочисленных дискуссий не только в лингвистике, но и в психолингвистике. Несмотря на то, что в середине 20 века прагматизм был отделен от философии, многие ученые противостояли развитию прагматизма. Основная причина этого в том, что прагматика меняется вместе с содержанием текста и отсутствует точность. В следующей статье представлена подробная информация по вопросам прагматизма и взгляды специалистов на развитие прагматизма.

Ключевые слова: Прагматика, языкознание, лингвистика, психолингвистика, точность, период, обратная связь.

Abstract. The field of pragmatics is still a field that can be found in many fields today, and it is precisely as a new language branch of linguistics that is of interest to many specialists and experts. Originally a part of the philosophical world, pragmatics became an independent branch of linguistics in the 1970s and is now the subject of much debate not only in linguistics but also in psycho-linguistics. Although separated from philosophy in the mid-20th century, the development of pragmatism has been opposed by many scholars. The main reason for this is that pragmatics change with the content of the text and there is a lack of accuracy. The following article provides detailed information on the issues of pragmatism and the views of experts on the development of pragmatism.

Key words: Pragmatics, linguistics, linguistics, psycho-linguistics, accuracy, period, feedback.

Introduction. Pragmatics is about much larger scope of meaning delivered by a real-time situation. The change in the meaning can occur attaching to the on-going situation. The success of the pragmatics is achieved when a text receiver correctly comprehend what is intended to be interpreted, corresponding each other in an expected way. If the message is not understood as it is supposed to be, it may result in the change of the communication act or behavior. Additionally, the success can depend on the language techniques employed or top vocabulary which only can be relevant to the surrounding situation that can help the listener to find out the implicitly suggested notion.

Literature review. According to Pamela Faber, the scope of the pragmatic meaning can be the entire utterances or single units. What can be employed here is in terms of the range of the context or the extension, size of the utterance utilized to deliver the communicative meaning. The whole context may stand to be used to say a single thing or even some word chunks can reveal the whole interpretation.

Pragmatics is also applied as specialized communication.

So, what is specialized communication?

This occurs on the basis of two prominent ascertains:

1. The situation where the communication is happening
2. The correlation between the text sender and receiver and how they are dealing with each other concerning the communication utterance.

Being contingent on the possessively referred meaning, the utterance is thoroughly analyzed by 2 categories:

1. Cognition-oriented view of pragmatics
2. Socio-cultural pragmatics (FP)

The meaning of a single word as well as the presented text by a message sender is directed to the aspect of cognition-centered category as the holistic utterance requires one to use the cognition to decode the implicit utterance whilst the communicating act is itself marked as the whole social unit as the entire meaning can be altered in accordance with a social background of a speaker.

Research methodology. The former which is the text that is also regarded one of the small segments of the communication act can be updated by an array of motives:

- The situation which can influence the formation of the secondary(contextual) denotation.
- The intended motive, the previous knowledge of case and beliefs of a text deliverer

Analysis and results. 1. If we study the rich history of pragmatics, it can root back in 1970s when psycholinguistics who were directing the focus to the development of the correlation between language and psychology, language experts began to spot the understanding of a single word's pragmatic structure plays a vital role in the formation of context. Unlike other specialists who accepted the language process consisting of focus on grammar and vocabulary enrichment, they managed to notice comprehension of a speaker settles the entire meaning of word or word combination. Despite a range of continuous attempts, there existed some oppressions as well as doubts against the essence of the pragmatism. Many regarded it as "waste of focus" or "waste of attention", "wastebasket of linguistics" in 1970s and 1980s, stating the human interaction cannot be stable and can change owing to a range of factors which lessen the possibility of exactness in the meaning. A number of experts on philosophy, namely Clark,1996; Bara, 2010;Noveck and Speber,2004 have shown huge passion toward deepening knowledge on pragmatics over the years.

2.Many accept the pragmatics as a field where there exists a necessity to prove the states and hypothesis put forward by linguistics and philosophers.

What is concluded by those researches is there is one prominent assumption arisen: "…the lingering assumption in much experimental pragmatics research is the idea that "pragmatics" refers, somewhat narrowly, to those aspects of linguistic processing that are inferential and not due to temporarily earlier linguistic coding/decoding processes"(Pragmatics Always Matters: An Expanded Vision of Experimental Pragmatics, Raymond W.Gbbs Jr. and Herbert L.Colston).

3.When the utterance is produced, the first sound and sounds combinations are noted and this is followed by the completion of syntactical together with semantic analysis. Grammatical focus is delivered at next stage as soon as words start interfering with each other. Pragmatic analysis comes last as the final stage where a listener will be able to comprehend the interpretation fully.

Noveck(2008) stated there was wide scope of centered focus on "theory of mind" or "mind-reading in term of experimental pragmatics".

Mind-reading- to be able to perceive what others are thinking

Theory of mind- the reference to the ability to understand others by ascribing mental states. It can differ from one person to another in accordance with beliefs, desires, intentions, emotions and thoughts.

Conclusion/Recommendations. Pragmatics is the process where people understand a single and same thing in a different way in accordance with their current state of mind and a situation.

A number of experimental pragmatics have assessed the cognitive capabilities as well as inabilities to understand the context. According to Nichols and Stich(2003), the correlation between comprehending the utterance and the produced interpretation. They stated that how we understand the contexts usually depends on how we create thoughts in our minds. What Sperber and Wilson wrote about is *"the relevance theoretic comprehension procedure"* which in turn, can refer to a theory of mind.

Experimental pragmatics studies usually what sorts of pragmatics are applied at which point of the conversation during the interpretation. Gaining the access for the origin of pragmatics, people can spot the late birth and development of pragmatics when we compare it with other linguistic aspects such as semantics, grammar, lexical sources. People may not purely aim to use the pragmatics when they start building a conversation but begin applying it to decode what communicators are talking about. They have prompt noticeable influence through the what people imply by a set of words they are uttering. (Gibbs,1994;Gibs and Colston, 2012).

To sum up, one can summarize that pragmatics has emerged gradually over the recent years and the youngest aspect of linguistics irrespective of the arguments put forward together with the doubts against the essence of pragmatics and should be regarded as the one needed to be delivered the thorough focus.

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EKPHRASIS IN THE WORKS OF RUSSIAN CLASSICS

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Annotasiya: Ushbu maqolada ekfrasis va uni rus klassiklarining o'z asarlarida qo'llashi haqida ma'lumot berilgan.

Kalit so‘zlar: ekfrasis, klassika, adabiyot, rasm, roman, erkinlik.

Аннотация: В этой статье представлена информация об экфрасисе, и использовании русскими классиками в произведениях.

Ключевые слова: экфрасис, классика, литература, картина, роман, свобода.

Abstract: This article provides information about ekphrasis, and the use of Russian classics in works.

Key words: ekphrasis, classic, literature, painting, novel, freedom.

Introduction. Dostoevsky is a recognized genius in ekphrasis. Perhaps the most famous "subject" is associated with the image that appears in the novel The Idiot. It is Hans Holbein's The Dead Christ in the Tomb, the first naturalistic depiction of Christ, which made an indelible impression on Dostoevsky. This impression was created and embodied in Hippolytus' monologue: "When you see the corpse of a tortured man, especially a born man, another strange question arises: if his disciples, his future chief disciples, see his corpse and see the women who followed him standing on the cross, all believe in him and love him, how can you believe, looking at the corpse, if death is so horrible and the laws of nature so strong, how can you overcome them?

This picture, expresses an understanding of the eternal power - dark, arrogant and foolish, to which everything is subject. These people surrounding the deceased, none of whom are here in the painting, must have felt a terrible longing and confusion that evening, which shattered all their hopes and almost all their beliefs at once. They had to be distributed in the most dreadful fear, but each of them had, in his own way, a gigantic idea on which that idea could never lean again. And if this teacher had seen his image just before his execution, would he have gone up on the cross and died as he did now?"

Dostoevsky usually tries to dissolve into his characters in his novels, as they give him freedom of action and thought, but here the Author Hans Holbein speaks from the hero's mouth, a monologue stating his opinion of the painting. In addition, the pictorial works are meant to deepen the idea and reflect from a different angle the novel's intent. Some of Dostoevsky's notes on the tomb of the dead Christ and the plot of the novel show that the novel's plan was related to the execution of the first Christ in 1521-1523, so a careful reading of the ekphrasis is important for understanding the main idea of the work.

Research Methodology. The classics of Russian literature were more closely associated with painting than would seem at first glance. The fact is that in the works of the Russian classic Leo Tolstoy there is rarely a direct ekphrasis (that is, a direct detailed image). Leo Tolstoy's novel Anna Karenina. For example, the novel "Anna Karenina" in the chapters of Anna Karenina on the journey of Vronsky and Anna in Italy, the heroes meet the artist Mikhailov, working on the "Notification of Pilate." Golenishchev and Vronsky see "the endless Christes of Titian, Raphael, and Rubens," the technique, the plans of the painting, but they do not look deeper. And so the spiritual light of Christ cannot be present. Through the text, Tolstoy reveals the problem of the meaning and purpose of art. And so cannot join the spiritual light of Christ. Through Tolstoy's text, the problem of the meaning and purpose of art emerges.

Tolstoy's time, and the Silver Age in particular, was the heyday of ekphrasis. There is probably not a single artist of the word who would not pay tribute to this technique. The time of modernism is the time of the search for new forms of art and the interaction of these arts. In the art of the Silver Age, the connection between the arts - painting, music, poetry, theater - was strengthened by the artist's belief in his ability to transform the surrounding reality and people by the power of art. Direct paraphrases, secret references to works of art were used by poet and artist Maximilian Voloshin, founder of Russian Symbolism Valery Bryusov, Anna Akhmatova, the futurists Vladimir Mayakovsky and Velimir Khlebnikov (you cannot count them all) in poetry and prose, in critical articles. It turned out to be extremely popular not only in the works of innovators and experimenters - Symbolists, Acmeists and Futurists, but also in the works of writers whose works belong to the realist tradition - M. Gorky, A.N. Tolstoy.

The portrait of Akhmatova as the "Tsarskoye Selo Muse" is traditional in literary studies, with researchers emphasizing that "the image of Tsarskoye Selo marks something important and new in her work, almost always far from melancholic nostalgia", "the image of Tsarskoye Selo, changing and gaining new meanings and reflections, passed through all her work, requiring some new understanding" and being "a sacred symbol" for Akhmatova. The numerous references to Tsarskoye Selo in Akhmatova's poems and prose (including references to statues) testify, above all, to the dissimilarity of the different symbolic contexts in which they appear.

In the light of these thoughts, ekphrasis in Ahmatov's poetics represents such a realization of the artistic integrity of the work in which "Ahmatova's main creative aspiration - comprehension of the running of time" is actualized in symbolic form through "the main situation of Ahmatov's poetry - the return of the past. The author's creative memory which "juxtaposes phenomena which are far removed in time" (Girshman) in the situation of ekphrasis "reveals the reality" of the eternal stone statue and at the same time correlates the fate of the statue which came alive in this way with the fate of the lyrical heroine. Recollection, as a phenomenon of man's psychological state in Tsarskoe Selo, relates Akhmatova to Pushkin, about whom Annensky wrote in his article Pushkin and Tsarskoe Selo: "It was in Tsarskoe Selo, in this park of 'memories' in the first place, that Pushkin's soul should have developed the propensity for the poetic form of memories.

Let me remind you of the text of Anna Akhmatova's poem:

Уже кленовые листы
На пруд слетают лебединый,
И окровавлены кусты
Неспешно зреющей рябины,
И ослепительно стройна,
Поджав незябнущие ноги,
На камне северном она
Сидит и смотрит на дороги.
Already the maple leaves
On the swan pond,
And the bushes are bloodied
Of slowly ripening rowanberries,
And dazzlingly slender,
With her feet unshivered,
On a northern stone she sits
She sits and looks at the roads.

Conclusion. Thus, the concept of ekphrasis expands and takes the reader into the plane of philosophy. What should true art be? Tolstoy the creator believed in the transformative and purifying power of any art form. Obviously, the writer is concerned with the process of creation and the awareness of himself as the creator of the artistic work. What's next? The classics of Russian literature prepared the fertile ground for the conquest of literature by the ekphrasis: the pictorial and sculptural ekphrasis , woven into the fabric of the work and often the key to the deep meanings of the work (as in Dostoevsky), now flicker here and there in texts of various genres.

Thus, ekphrasis is not only "the place in literature where its connection with the arts is carried out in an unusually direct and visual way," but also, as these examples show, the ideological and aesthetic center of the lyric poem, which, being sacred in its essence, represents the connection between the destiny of the individual and the history of culture.

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QUALIMETRIC ANALYSIS OF THE CHARACTERISTICS OF SATELLITE NAVIGATION SYSTEMS

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Annotatsiya. Insoniyat taraqqiyotining hozirgi bosqichida radionavigatsiya tizimlari, vositalari va qurilmalariga tobora ko'proq talablar qo'yilmoqda, bu esa axborotni qayta ishlash tezligiga, olingan ma'lumotlarning ishonchliligi, hajmi va aniqligiga, shuningdek, axborotni qayta ishlash tezligiga talablarning ortishi bilan bog'liq. bunday texnologiyalardan foydalanish intensivligini oshirish. Aniqlangan holatlar zamonaviy uchuvchilarning navigatsiya xavfsizligini ta'minlash bo'yicha faoliyatini murakkablashtiradi, bu tez va to'g'ri qaror qabul qilishni talab qiladigan juda qiyin sharoitlarda o'zini namoyon qiladi. Barcha mavjud radionavigatsiya asboblari va tizimlari, ulardan foydalanish sohasidan qat'i nazar, vaqt, makon va tashkiliy jihatdan qulaylik kabi talablarga javob berishi kerak; ma'lumotlarni aniqlashning aniqligi; ishning uzluksizligi; yaxlitlik. Shuning uchun navigatsiya xavfsizligini yaxshilash uchun eng samarali radio navigatsiya tizimlari va qurilmalarini aniqlash talab etiladi. Tadqiqotning maqsadi - radionavigatsiya asboblarining asosiy xususiyatlarini

kvalimetrik tahlil qilish. Maqolada Galileo, GPS va GLONASS radio navigatsiya tizimlari va qurilmalari tahlil qilinadi. O'rganilayotgan radionavigatsiya tizimlari haqida asosiy ma'lumotlarni to'plash tanlangan tizimlarning xususiyatlarini, texnik hujjatlarini o'rganish, shuningdek tadqiqot muammosi bo'yicha zamonaviy ilmiy manbalarni tahlil qilish yordamida amalga oshirildi. Tadqiqot davomida tanlangan radionavigatsiya tizimlarining asosiy xususiyatlari tavsiflangan, shuningdek, ularning xarakteristikalari qiyosiy tavsiflangan. Tahlil noaniqlik sharoitida qabul qilish usullarini baholash mezonlarini tanlash asosida amalga oshirildi. Tahlil uchun mezon sifatida quyidagi mezonlar tanlangan: Xurvits, Savaj, Vald, Laplas mezonlari. Kvalimetrik tahlil natijasida eng samarali sun'iy yo'ldosh tizimi tanlandi.

Kalit so'zlar: navigatsiya, navigatsiya xavfsizligi, radionavigatsiya asboblari, sun'iy yo'ldosh tizimlari, kvalimetrik tahlil.

Аннотация. На современном этапе человеческого развития к радионавигационным системам, средствам и приборам предъявляется все больше требований, что обусловлено повышением требований к оперативности обработки информационных сведений, надежности, объему и точности получаемых сведений, а также увеличением интенсивности использования таких технологий. Выделенные обстоятельства усложняют деятельность современных пилотов по обеспечению навигационной безопасности, что проявляется в достаточно сложных условиях, требующих принятия быстрых и правильных решений. Все существующие радионавигационные приборы и системы вне зависимости от области их использования должны отвечать таким требованиям, как доступность во временном, пространственном и организационном плане; точность определения данных; непрерывность работы; целостность. Именно поэтому требуется определение наиболее эффективных радионавигационных систем и приборов для повышения навигационной безопасности. Целью исследования считается проведение квалиметрического анализа основных характеристик радионавигационных приборов. В статье проводится анализ радионавигационных систем и приборов Galileo, GPS и ГЛОНАСС. Сбор основных информационных сведений об исследуемых радионавигационных системах осуществлялся с помощью исследования характеристик, технической документации выбранных систем, а также анализа современных научных источников по проблеме исследования. В процессе исследования были описаны основные особенности выбранных радионавигационных систем, а также представлена сравнительная характеристика их характеристик. Анализ проводился на основе выбора критериев по оценке методов принятия в условиях неопределенности. В качестве критериев для анализа были выбраны: критерии Гурвица, Сэвиджа, Вальда, Лапласа. В результате проведенного квалиметрического анализа была выбрана наиболее эффективная спутниковая система.

Ключевые слова: навигация, навигационная безопасность, радионавигационные приборы, спутниковые системы, квалиметрический анализ.

Abstract. On the modern level of human development, more and more requirements are imposed on radio navigation systems, means and devices, which is

due to increased requirements for the speed of processing information, reliability, volume and accuracy of the information received, as well as an increase in the intensity of the use of such technologies. Current situations can make the tasks of modern pilots more complicated ensuring navigational safety, which manifests itself in rather difficult conditions that require quick and correct decision. All existing radio navigation instruments and systems, regardless of their area of use, must meet such requirements as accessibility in time, space and organizational terms; accuracy of data definition; continuity of work; integrity. That is why it is necessary to determine the most effective radio navigation systems and instruments to improve navigation safety. The aim of the study is to conduct a qualimetric analysis of the main characteristics of radio navigation devices. This article analyzes Galileo, GPS and GLONASS radio navigation systems and devices. The collection of basic information about the studied radio navigation systems was carried out by studying the characteristics, technical documentation of the selected systems, as well as analyzing modern scientific sources on the research problem. During the research study, the main features of the selected radio navigation systems were described, and a comparative description of their characteristics was also presented. The analysis was carried out on the basis of the choice of criteria for evaluating acceptance methods under uncertainty. The following criteria were chosen as the criteria for the analysis: the Hurwitz, Savage, Wald, Laplace criteria. As a result of the conducted qualimetric analysis, the most efficient satellite system was chosen.

Key words: navigation, navigation safety, radio navigation devices, satellite systems, qualimetric analysis.

Inroduction. Navigation technologies in the modern world are at such a level of development, which, first of all, allows them to be used in different areas and fields of activity. Today, the range of use of radio navigation devices and systems is considered to be quite wide. Radio navigation instruments and systems in the world practice have found their own application in civil and military aviation, ground transport management, shipping, etc. [8, c. 21].

In recent years, the development of methods and means of radio navigation support is carried out at an increased intensity, strengthening the requirements for reliability, accuracy and volume of information, as well as the speed of processing such information [3, c. 105]. That is why it is necessary to select the most efficient radio navigation instruments and systems, which is possible due to the qualimetric analysis of their characteristics.

Method and Methodology. In order to carry out a qualimetric analysis of the characteristics of radio navigation devices within the framework of this study, based on the quality indicators of radio navigation devices, the ranking of their main characteristics on a point scale was first carried out. Based on the score ranking, a qualimetric assessment of the quality of radio navigation instruments was carried out according to the following criteria:

1. Hurwitz criterion.
2. Savage's criterion.
3. Wald criterion.
4. Laplace criterion.

Based on the totality of the received criterion calculations, the best version of the radio navigation device was determined.

Research Results. In the course of the study, an analysis was made of the characteristics of Galilleo, GPS and GLONASS radio navigation devices. Let's take a closer look at them.

1. Galileo. This system is a satellite navigation system project. The purpose of the system is to solve navigation problems for moving objects with an accuracy of up to 1 meter. As noted in modern scientific research, Galileo is a global and unique project of the modern queuing system [1, c. 121].

2. GPS. This radio navigation system was developed for the US Department of Defense, which controls it. The main purpose of the radio navigation system is the determination of consumer coordinates with high accuracy, which make up the velocity vector, as well as linking them to the system time scale.

Radio navigation system GPS includes following segments:

– Consumer segment;
– command-measuring ground complex;
– space segment [7, c. 124].

3. GLONASS is the main Russian radio navigation system, the purpose of which is to determine the exact time, speed and location of land, air, marine vehicles and other types of consumers [2, c. 294].

In order to carry out a qualimetric analysis, radio navigation instruments were classified according to the basic principles of their operation and their characteristics

Characteristics	GLONASS	Galileo	GPS
Used frequency	1575,6 MHz	1575,42 MHz	1575,42 MHz
Orbit radius	19100,0 км	29378,137 км	26561,75 км
The inclination of the orbital planes	64 º	54 º	53 - 56 º
Separation of satellites according to the orbital planes	Evenly	Evenly	Uneven
The number of orbital planes	3	3	6
The number of satellites	28	30	27

were summarized in Table 1.

Table 1. Main characteristics of radio navigation instruments

Let's present in Table 2 the ranking of the main characteristics of radio navigation instruments on a point scale (1-10, where 1 is the worst, 10 is the best).

The classification of radio navigation instruments according to the basic principles of their operation is shown schematically in the figure 1 [3].

The main operating principles of radio navigation devices		
Navigation devices of general use (magnetic and gyro-compass, speedometer, barometric altimeter).		Autonomous on-board radio navigation devices (RNU) (radio altimeter, doppler speedometers and the drift,)

Astronomical (astronomic compass and sextants, astronomic orientator and others)		lighting and other visual devices (beacon, landing lights, spotlight and others)
Land basis and space basis radio navigation systems (RNS)		Inertial navigation aids

Figure 1. Classification of radio navigation devices according to the basic principles of their operation

Characteristics	GLONASS	Galileo	GPS
Used frequency	10	9	9
Orbit radius	7	9	10
The inclination of the orbital planes	8	9	9
Separation of satellites according to the orbital planes	10	10	9
The number of orbital planes	7	7	10
The number of satellites	9	10	8

Figure 2. Ranking of the main characteristics of radio navigation devicesAccording to the datum which is given in the Figure №2, it is required to build matrix for the purpose of further analysis (Fiure 3).

10	7	8	10	7	9
9	9	9	10	7	10
9	10	9	9	10	8

Figure 3. Matrix for analysis. Based on the presented matrix, we calculate the Hurwitz, Savage, Wald, Laplace criteria.

1. Criteria of Laplace as it is pointed out in the research of D.V. Shumanchuk, is orientated on the principles of insufficient proves. According to this principle, the researcher writes, since the probability distribution of specific states is unknown, there is no reason to consider such probabilities to be different. That is why it is necessary to use the optimistic assumption that the probabilities are equal. The criterion is determined according to the formula (1) [11]:

$$\max_i(\frac{1}{n}\sum_{j=1}^{n} a_{ij} \qquad (1)$$

Based on the matrix presented in Table 3, as well as using formula (1), we calculate the Laplace criterion:

$$\max_i(\frac{51}{6};\frac{54}{6};\frac{55}{6}) = \frac{55}{6}$$

Current calculation data indicate that the greatest value of the mathematical expectation of "gain" in terms of the characteristics of radio navigation devices is observed in the GPS system.

2. Wald's criterion, as noted in the work of L.S. Krutovoy, is a criterion for a guaranteed win. The scientist writes that the use of this criterion makes it possible to determine in which case the object accepts the most advantageous line of behavior. The criterion is determined by the formula (2) [5, c. 195]:

$$\max_i(\min_j a_{ij}) \qquad (2)$$

Based on the matrix presented in Table 3, as well as using formula (2), we calculate the Wald criterion:

$$\max_i(7;7;8) = 8$$

The calculation data indicate that the guaranteed “winning” object in terms of the characteristics of radio navigation devices is the GPS.

3. Savage's criterion. In the work of M.A. Khalikov and A.Yu. Kukharenko notes that this criterion is considered one of the criteria for making decisions under conditions of uncertainty. Scientists note that the calculation of the criterion makes it possible to find the best solution from the solution options under conditions of uncertainty. The criterion is determined by the given formula (3) [6, c. 64]:

$$\min_i(\max_j r_{ij}) \qquad (3)$$

However, before proceeding to the calculation of the Savage criterion, it is required to construct a matrix of the difference in scores, for this we use the formula (4)

$$r_{ij} = \max_i a_{ij} - a_{ij} \qquad (4)$$

Let's present the score difference matrix in the **figure** 4

Point difference matrix

0	3	2	0	3	1
1	1	1	0	3	1
1	0	1	1	0	2

Based on the matrix presented in Table 4, and using formula (3), we calculate the Savage criterion: $\min_i(3;3;2)$

According to the data obtained, the best solution of the decision options under uncertainty is the GPS system.

4. Hurwitz criterion. D.V. Foshin in his own study notes that the criterion is the criterion for the optimality of pure strategies [10, c. 133]. In the work of L.G. Labsker's formula for determining the criterion is given [7, c. 137]:

$$\max_i(\alpha \max_j a_{ij} + (1-\alpha)\min_j a_{ij}) \qquad (5)$$

Let's calculate the Hurwitz criterion:

$$\max_i(3\alpha + 7; 3a + 7; 2a + 8)$$

Using the results obtained, we will draw up a graph of the optimal-pessimistic analysis according to the Hurwitz criterion (Figure 1).

Pic. 1. Graph of optimal-pessimistic analysis by the Hurwitz criterionCalculations of the Hurwitz criterion indicate that the best is the GPS radio navigation system, since it has the smallest spread of values, and its pessimistic expectation point is higher.

Conclusion. In the course of the study, we conducted a qualimetric analysis of the characteristics of radio navigation devices Galilleo, GPS and GLONASS. To carry out such an analysis, the criteria of Hurwitz, Savage, Wald, Laplace were used. The data obtained as a result of calculations indicate that the GPS radio navigation system has the best performance.

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DETERMINATION AND ASSESSMENT OF HYDROCHEMICAL CHANGES IN WATER RESOURCES OF THE AIDAR-ARNASOY LAKE SYSTEM

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Annotatsiya: Aidar-Arnasay kullar tizimi Sirdaryoning o‘rta okimida, Chordara suv omborining zhanubida zhoylashgan va Qizilqum chollari bilan tutashib ketgan. Kullar tizimiga kiradigan eng katta Aidarkul kuli zhanubiy-sharqda Nurota tizmasi etagida 130 km-ha chuzilgan bwlib, Tuzkon kuli khavzasi bilan qushilib ketgan va 70 km uzunlikdagi Sharqiy Arnasay kullari tizimi bilan boglangan.

Kullar tizimi suv omborlarining sifat kwrsatgichlari: Chardara suvidan suv kuyilishi tomonida Arnasoy kwli suvining minerallashuvi ruhsat etylgan meyoridan 6.7-8.1 baravar, Tuzkon kwlida 9.6-12.8 baravar, Aidar kwlida 9.8-14.5-14. kw bulgan.

AAKT mamlakat aholisini ozik-ovkatbaliq (oziq-ovkatbaliq) mahsulotlari bilan ta'minlashda manba bulgani uchun kwllar tizimi suv resurslari tarkibidagi ogir metallar va boshka ifloslanish midorini doimiy monitoring qilish talab qilish.

Kullar tizimining suv resurslarining minerallashuvi, REM- ogir metalllar va boshka komponentlarning REM- ogir suv manbalaridan darazhada oshib ketmasligiga olish suv resource hazhmi va mikdori keskin kamayishining suv resurslari uchun.

Kalit so’zlar: ko'llar tizimi, gidrokimyosi, sifat ko'rsatkichlari, minerallashuvi, ehtiyot choralari, anionlar, og'ir metallar, GIS.

Аннотация. Озерная система Айдар-Арнасай расположена в среднем течении реки Сырдарья, южнее Чордаринского водохранилища и соединяется с пустыней Кызылкум. Самое крупное озеро озерной системы, озеро Айдарколь,

протягивается на 130 км на юго-восток у подножия Нуратинского хребта, впадает в бассейн озера Тузкан и соединяется с системой озер Восточный Арнасай протяженностью 70 км. Качественные показатели водных ресурсов озерной системы: в 6,7-8,1 раза больше допустимой нормы минерализации озера Арнасай на напорной стороне Чардаринского водохранилища, в 9,6-12,8 раза больше, чем в озере Тузкон, в 9,8-14,5 раза больше, чем в Айдаре. Озеро, которого было много.

Так как ААОС является важным источником пищи (рыбы) для населения страны, озерная система требует постоянного контроля содержания тяжелых металлов и других загрязняющих веществ в водных ресурсах. Озерная система важна для региона для предотвращения резкого снижения объема и количества водных ресурсов с целью недопущения значительного превышения ПДК минерализацией водных ресурсов, тяжелыми металлами и другими химическими компонентами.

Ключивые слова: озерная система, гидрохимия, качественные показатели, минерализация, предохранители, анионы, тяжелые металлы, ГИС.

Abstract. The Aidar-Arnasay lake system is located in the middle reaches of the Syrdarya River, south of the Chordara reservoir and is connected to the Kyzylkum desert. The largest lake of the lake system, Lake Aydarkol, stretches for 130 km to the southeast at the foot of the Nurata Range, flows into the basin of Lake Tuzkan and connects with the East Arnasay lake system with a length of 70 km.

Qualitative indicators of the water resources of the lake system: 6.7-8.1 times more than the permissible mineralization rate of Lake Arnasay on the pressure side of the Chardara reservoir, 9.6-12.8 times more than in Lake Tuzkon, 9.8-14 times, 5 times more than in Aidar. Lake, which was a lot.

Since AALS is an important source of food (fish) for the population of the country, the lake system requires constant monitoring of the content of heavy metals and other pollutants in water resources.

The lake system is important for the region to prevent a sharp decrease in the volume and quantity of water resources in order to prevent a significant excess of AC with mineralization of water resources, heavy metals and other chemical components.

Key words: lake system, hydrochemistry, quality indicators, mineralization, cautions, anions, heavy metals, GIS.

Introduction. The Aydar-Arnasay lake system is the largest artificial reservoir in the Aral Sea basin, formed by the confluence of three lakes: Arnasay, Tuzkon and Aydarkol.

The Aidar-Arnasay system of lakes (AALS) is located 250 km from Tashkent, along the middle course of the Syr Darya River, south of the Chordara reservoir, in the Jizzakh and Navoi regions of the Republic of Uzbekistan (Fig. 1).

AALS is the largest lake in Uzbekistan, located in the natural basin of the southern Kyzyl Kum, and has collected more water than any other reservoir in the region.

The maximum length of the AALS is 160.4 km, the level is 246.54 m abs. The total area is 3478 km2, the volume is 41.1 km3 [1,2].

R. Kulmatov et al. It has been established that the salinity of the water of the lake system, which is an important indicator of quality - the amount of total dissolved

substances in water, causes uneven mineralization in different parts of the lake, depending on the hydrological regime of the ACC. The mineralization of the water of Lake Arnasay was low, while the mineralization of the waters of Aydarkul and Tuzkan was relatively high [3].

Hydrology and hydrochemical state of the Aydar-Arnasai lake system was studied by field expedition observations by Belikov I. et al., 2011 [4]. The mineralization of water in the lake system in the 1990s was 10-11 g/l in Lake Tuzkon and 11-12 g/l in Lake Aidar. Since 1993, there has been an annual decrease in the salinity of the water of the lake system due to the inflow of water from the Chardara reservoir.

The influence of the human factor on the change in the water regime of the Chordara reservoir on the left bank of the Syrdarya River was studied (Issina B. et al., 2019). The results of the study showed that the change in the water regime of the Chordara reservoir was mainly affected by the use of water resources in agriculture and electricity generation. The results of the study did not study the effect of changes in the hydrological and hydrochemical regime of the Chordara reservoir on the regime of water resources of the AALS [5].

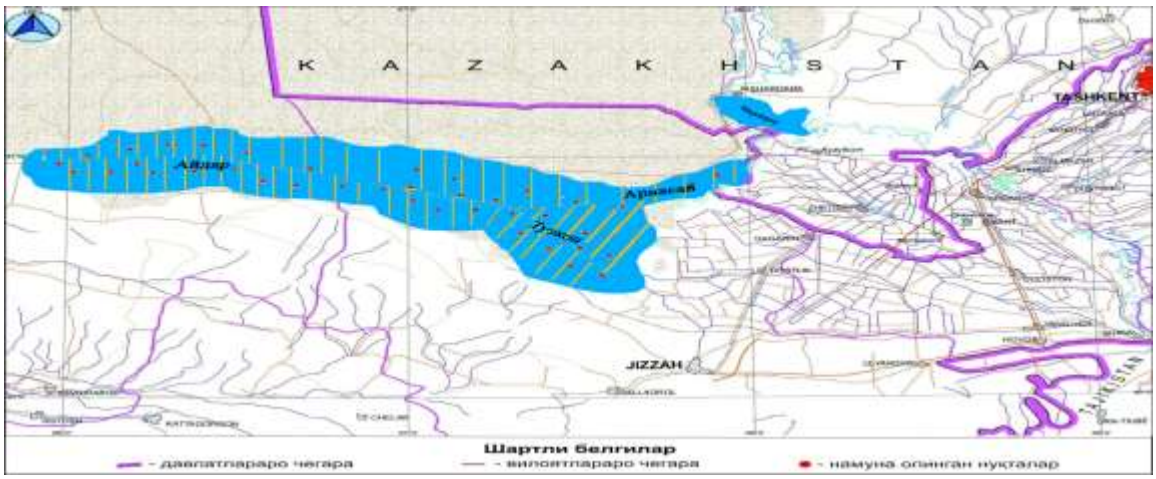
The study and assessment of water quality indicators of the lake system for the protection and rational use of water resources important for the region AALS is important in the development of ecotourism and fisheries in the region.

The purpose of this study is to assess changes in the chemical composition of AALS water resources over time and over distance by integrating physico-chemical methods and GIS technologies.

Materials And Methods. 2.1. Experimental zone The study area and sampling points are shown in fig. 1. Water sampling sites were used as the AALS polygon, since the contours provided by the Aidar-Arnasay Lake System Department to the fishery tenants were fixed points with constant contours. The total area of the AALS is divided into 164 contours, of which 4 water samples were taken from Arnasay Lake, 6 from Tuzkonkol Lake, 10 from Aydar Lake from a total of 20 points. Field sampling was carried out in October-November 2021.

2.2. Used methods of analysis.

For the analysis of water samples, atomic absorption, gas chromatographic, photometric, photocolorimetric, gravimetric, spectrophotometric, titrimetric, and other physicochemical methods were used. The pH value was determined in the field. Water mineralization was determined by the gravimetric method, ammonia-photometric method, sulfate ions by complexometric, chlorargenometric, total hardness by complexometric method.



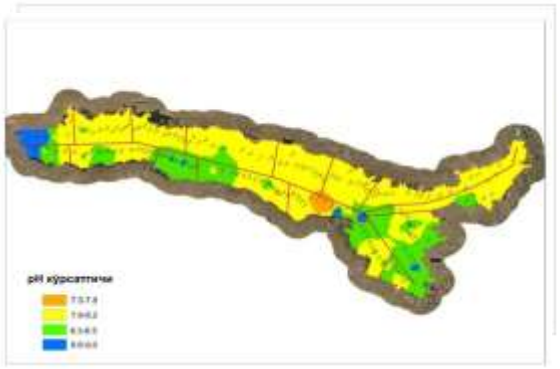
Symbols: • - Sample points

Figure 1. Study area and sampling points using GIS methods for analysis.

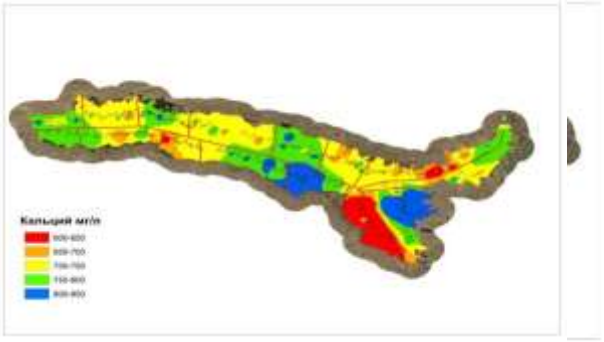
Geographic information systems are widely used in the field of ecology, as well as in traditional areas. This method allows you to quickly solve such problems as data processing, mapping, assessing the state of ecosystems, and forecasting.

Results And Discussion. Water quality indicators of lakes Arnasay, Tuzkon and Aydar within the AALS: pH, salinity, cations, anions and heavy metals in the sum of water samples taken from 4 points of Lake Arnasay, 6 points of Lake Tuzkon, 10 points of Lake Aidar and analyzed using GIS results 2- shown in the figure.

2- a) Figure



2- b) Figure



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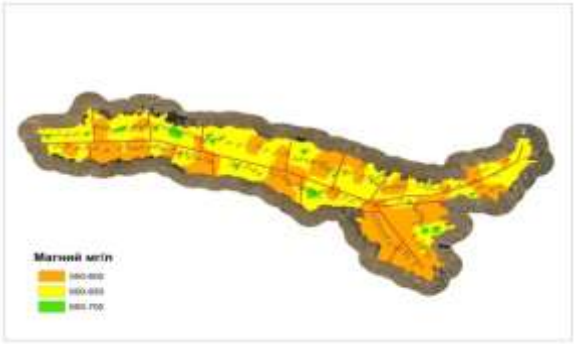

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in comparison with the data of 2011 and the results of the study obtained between 2021 revealed the following.

The inflow of Syrdarya waters into the AAKT through the Chordara reservoir has decreased in recent years, and in 2013, 2017, 2018 and 2021, water from the Chordara reservoir did not enter the lake system at all. Due to the decrease in the amount and

area of the AALS waters, the chemical composition of the water of the lake system will increase by 2021, compared with the quality indicators and allowable quantities of 2011.

Water quality of Lake Aidar - the water of Lake Tuzkan, which has a significantly higher mineralization and other components than AC, has a significantly higher mineralization, content of cations and anions in the water of Lake Aidar due to a decrease in water volume in 2011-2019. due to high volatility.

Conclusions. Changes in AALS water quality indicators over time and distance were assessed based on the results of analysis based on samples taken from special contours and maps processed by GIS methods.

The spatial distribution and variability of lake water quality indicators: pH, salinity, silicon oxide, cations, anions and heavy metals due to fluctuations in the amount of water entering the AALS through the Chardara reservoir in 2011 and 2019 and the flow of DW water were assessed.

In connection with the regular inflow of JGD, Kli, Akbulak and Pogranichny ditches into the lake. Tuzkon, the average mineralization of water in 2019 will be 7.4 g/l in the lake. Arnasay, 11.17 g/l in the lake. In Aidar Lake it was 12.12 g/l.

In order to reduce the amount of water in the AALS and the mineralization of water, the amount of heavy metals and other components will not significantly exceed AC, regular discharge of Syrdarya water from the Chardara reservoir will be required under an intergovernmental agreement.

In order to develop fish farming and fishing ecotourism, it is necessary to conduct a comprehensive study using a stationary network for monitoring the ecological state of water bodies, using modern equipment and monitoring methods, including remote sensing and satellite data.

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APPLICATION OF «CIFROIL" INFORMATION-MEASURING AND CONTROL SYSTEM IN OIL REFINERIES

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Annotatsiya: Zamonaviy bozor neft mahsulotlarini iste'molchilarga neftni qayta ishlash zavodlarida tarqatish uchun axborot va o'lchov tizimlarining sifati va ishonchliligiga yuqori talablarni qo'yadi. Maqolada boshqaruv tizimlarining ayrim turlari, raqamli qurilmalar, ularning neft mahsulotlarini taqsimlashni baholash mezonlari ko'rib chiqiladi.

Kalit so'zlar: raqamli qurilmalar, boshqaruv tizimlari, axborot-o'lchov tizimlari, neft mahsulotlarini taqsimlash.

Аннотация: Современный рынок предъявляет высокие требования к качеству и достоверности информационно-измерительных систем распределения нефтепродуктов потребителям на НПЗ. В работе рассматриваются некоторые виды систем управления, цифровых устройств, критерии оценки их распределения нефтепродуктов.

Ключевые слова: цифровые устройства, системы управления, информационно-измерительные системы, распределение нефтепродуктов.

Abstract. The modern market places high demands on the quality and reliability of information and measurement systems for the distribution of petroleum products to consumers at refineries. The paper discusses some types of control systems, digital devices, criteria for assessing their distribution of oil products.

Keywords: digital devices, control systems, information-measuring systems, distribution of petroleum products.

Introduction. The main direction of improving measurements in an automated enterprise is the transfer to motor monitoring according to metabolic concepts, to the introduction of complex control and information-measuring systems (IMS). In connection with this, the concept of mathematical estimates of optoelectronic channels is decisively raised, which underestimates the geophysical classifications of not only

all power units included in a precision TV channel but also the long-term effects of channels on each other.

Literature review. A. V. Ionov, V. A. Lopukhin, M. B. Shekhtman's article in the journal "sphere oil and gas" and the study of the software instructions of «CifrOil" system was summed up.

Analyzes and results. Measuring information technologies are a cross between information nanotechnologies and stand out from this vast abundance in that they are of an indisputable scientific and cognitive nature and carry out specific executions that are unique to them.

Measuring system - a set of functionally integrated measures, measuring instruments, measuring transducers, computers, and other technical means located at different points of the controlled object, etc. for the purpose of measuring one or more physical quantities inherent in this object, and generating measuring signals for various purposes. [1]

Examples:

1. Measuring system of a thermal power plant, which makes it possible to obtain measuring information on a number of physical quantities in different power units. It can contain hundreds of measurement channels.

2. A radio navigation system for determining the location of various objects, consisting of a number of measuring and computing complexes spaced apart in space at a considerable distance from each other.

Measuring system - a classification in a certain way of interrelated measurements and other design and technological devices (substrates of the measuring structure), - forming measuring channels, implementing the measurement process, and providing semi-automatic (automated) provision of measurements (expressed with the support of numbers or codes defined by it) improving during the time and physical dimensions distributed in space, characterizing the special phenomena of the subject of measurements.

As a result, there may be no factory regulatory and technological documentation (technological conditions) that regulates technical, in particular, metrological prescriptions for IMS as a single production. Accordingly, there are difficulties with the implementation of tests for type approval tasks [2].

The possibility of formation, growth of IMS during operation or the ability to change its composition (structure) depending on the tasks of the experiment, essentially makes it difficult or allows the regulation of prescriptions for such IMS, in contrast to ordinary MI, which is "completed" products at the time of their release by the manufacturer.

If the structure of the SI is unchanged and the conditions for its use remain the same throughout the automation period, it is possible to predetermine an input-output model. Also, the 5150 multichannel network measuring instruments for measuring the humidity of the Shining Corporation have normalized MX and, from the point of view of the advertiser, are not considered from institutional positions. Mechanization is also not necessarily related to the structuring of the SI, interpreted as a structure. A compact device considered a single piece of equipment, maybe slightly automated. An example is a modern analog voltmeter, which has automatic functions for selecting the

measurement principle, setting the radio range of measurements, and periodic correction. The clarifying opposition “system” indicates the expediency of taking into account the problem of the SI structure, even if it is treated as one channel.

It is advisable to consider the development of IIS in two aspects: structural and functional. The first reflects the integration of various subsystems, the widespread use of computer technology, which leads to the emergence of systems with a flexible structure. The second aspect characterizes a sharp increase in the number of functions performed by the system. In this case, the center of gravity is transferred from the measurement functions to other related functions associated with the use of measurement results.

Thus, in the IMS, the measurement is increasingly becoming inextricably linked with other functions (logical processing, analysis of measurement results, etc.) and its selection is not always possible. Given the above features of IIS, we can give the following two definitions of IP and IIS in a broad sense [3]. The largest structural unit of the IMS, for which metrological characteristics (MC) can be normalized, is the measuring channel (MC). It is a serial connection of the MIs forming the IMS (some of these MIs themselves can be multichannel, in which case we should say the serial connection of the ICs of the indicated MIs).

Such a MI connection, provided by the functioning algorithm, allows you to perform a complete function from the perception of the measured value to the indication or registration of the measurement result, including or changing it into a signal convenient for further use outside the IMS, for input into a digital or analog computing device that is part of the IMS, for joint conversion with other quantities, for influencing actuators.

Taking into account the multi-channel nature of the IMS, the use of the same devices as part of various ICs, the latter can often be distinguished only functionally and their configuration is implemented only by software. The length of the IC can range from several meters to several hundreds of kilometers. The number of IRs is up to several thousand. Information from primary transducers is usually transmitted using electrical signals (less often pneumatic) - current, voltage, pulse repetition rate. In some areas of measurement, modern primary measuring transducers have a digital code. With a large length of IR, radio signals are used. The part of the IMS after the communication lines connecting it with the primary converters is usually called the measuring and computing complex (MCC). A significant part of modern ICCs is built on the basis of controllers, as a rule, of a modular design, including analog-to-digital and digital-to-analog converters, a processor, modules of discrete (binary) information (input and output), auxiliary devices. The composition, configuration, software of the IVC is specified taking into account the specifics of the object.

During the production and operation of such IMS, specific instances of the receiving and transmitting parts that will work together are not known in advance, thus there is no “standard” object for which the MX is regulated. Control and MO IMS as integral object makes it difficult to use the original measuring transducers built into the process equipment. The widespread use of computer technology as part of IMS raises the problem of certification of algorithms for processing measurement results.

The peculiarities of IMS make the problem of calculating the MH of IMS according to the MH of their constituent components especially relevant for them. The method of calculating the MC IC of the IMS depends significantly on whether the SI forming it belongs to linear devices. Methods for calculating nonlinear systems depend on the type of nonlinearity, the possibility of dividing the SI into a linear inertial and nonlinear inertia less part, and on other circumstances and are very diverse.

Purpose and types of IIS.

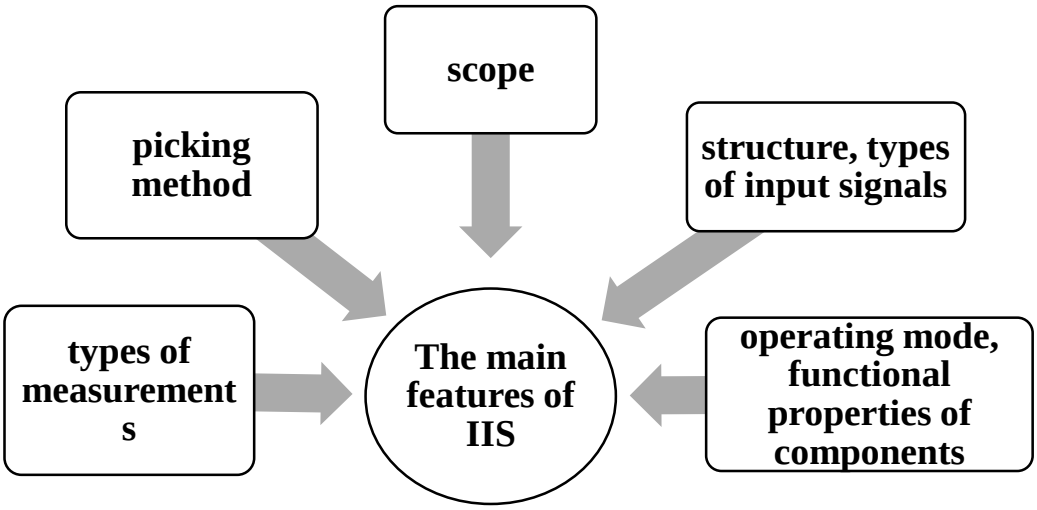

Figure1. The main features of IIS.

The signals at the input of the IMS can be continuous or discrete, deterministic or random.

Depending on the relationship between the rate of change of input signals and the inertial properties of the system, two main modes of operation of the IMS are distinguished: static and dynamic. In dynamic mode, the inertial properties of the system influence the measurement result.

The IIS component is understood as the technical devices included in the IIS that perform one of the functions provided for by the process of measuring and converting measurement information into other types of information. In accordance with the functions, the components are divided into measuring, connecting, computing and information.

The measuring component of the IMS is a measuring instrument: a measuring device, a measuring transducer, a measure, a measuring switch [3].

High-precision components according to the nature of functional transformations are divided into analog-to-digital and digital-to-analog ones. And analog components can be linear and non-linear, analog-digital ones are quantum devices in their originality.

The connecting component of the IMS is a technical device, or part of the environmental adaptation, designed to transmit, with the utmost possible simplification, signals that carry information about the measured density, from one factor of the IMS to another.

The microprocessor component of the IMS is an electronic computing device (or part thereof) together with software that performs the duty of processing (calculating) the results of tracking in order to conditionally obtain measurement results characterized by a number or an appropriate code.

The measuring component of the IIS is a technological tool designed for obtaining information, storing, implementing, and transmitting.

From the point of view of the information methodology of measuring facilities, the measurement process performed by any metrological device (including sufficient actions of the individual operator) consists of a series of step-by-step transformations of information about the measured configuration, carried out until it is shown in the form for which it is obtained. and this measurement is performed. SI is considered as a channel for receiving (receiving) and transmitting (measuring) information. Thus, the MI and the high-precision IMS component are characterized by a kind of communication component. Control subsystem for loading into tank trucks. This subsystem is designed for automated commercial accounting and process control when dispensing petroleum products through fuel-dispensing risers for loading into tank trucks. The block diagram of the subsystem is shown in Figure 1. [4]

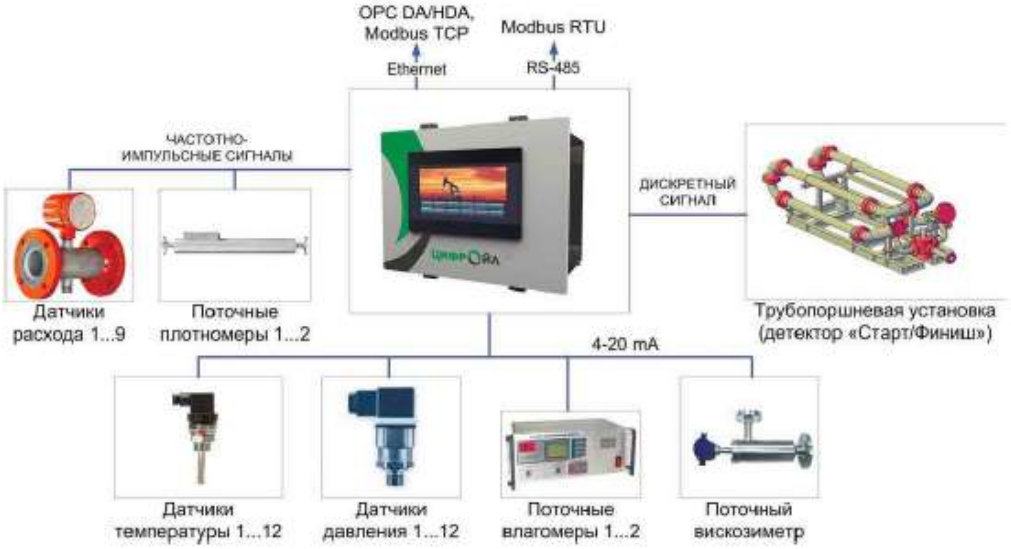

Figure 2. Structural diagram of the subsystem

Information-measuring system of the new generation «CifrOil» for commercial calculations of oil and oil products.

As part of the digitalization of the oil industry, the reform of digital nanotechnologies plays a key role in the country's economy, it is necessary to monitor all stages of production, oil refining to constantly monitor the quantity and properties of oil and ammonia.

Oil and gas companies always pay a lot of attention to the issues of accounting for oil refining and are constantly working to improve the mathematical support of accounting systems to increase their productivity, reliability, and efficiency. The task of increasing the quality of energy carriers produced at oil-producing plants (refineries) is inextricably linked with the improvement of control schemes for the properties of oil and energy carriers for the timely and irrefutable provision of data to control systems for raw materials and technological processes. Until recently, a large third of the market was concentrated by foreign manufacturers. Apparently, in connection with the import substitution announced by the State of the Russian Federation, as well as with the current sanctions from the United States and the EU republics, there was a need for Russian oil and ammonia flow calculators with characteristics no worse than foreign

prototypes. These circumstances served as favorable reasons for the development and launch of an innovative producer of oil products «CifrOil» on the market.

Table 1

Main technical characteristics of the «CifrOil» oil and oil products flow calculator

Measured environment	**Oil and oil products**
– Density	611,2…1163,9 kg/m^3
– Volume fraction of water	0…97%
– Free gas content	not allowed
Number of measuring lines	up to 9
Number of connected density meters	Up to 2
Number of connected moisture meters	Up to 2
Number of connected samplers	Up to 2
Number of current (4–20 mA) signals	Up to 32
Reduced measurement error of direct current	± 0,05%
Number of frequency-pulse signals	Up to 24
Relative error of frequency measurements	± 0,001%
Relative calculation error: – density – gross weight	± 0,01% ± 0,035%
Touch color monitor	7” (800x480)
Communication interfaces for information exchange with external devices	1) Ethernet port - for data transmission to the upper level via Modbus TCP, OPC DA/HDA protocols 2) RS-485 port (Modbus RTU) - for data transfer to the upper level or for connecting devices with a digital interface 3) RS-232 port - for connecting a device with a digital interface 4) Built-in GSM / GPRS modem (optional) - for data transmission to the upper level
Supply voltage, V	~20…28 V or ~198…242 V
Power consumption no more	60 W
Overall dimensions and placement methods (WxHxD): - into the cupboard – in 19” rack - hinged execution	340×270×200 mm 482.6×270×200mm 315×240×200 mm
Weight	8 kg
Operating conditions: - air temperature – air humidity (at 35°C) - Atmosphere pressure	from 0 to 50°C up to 85% from 84 to 106 kPa
Calibration interval	4 years
Average service life not less than	10 years

Purpose. The flow calculator «CifrOil» is designed to calculate the flow rate and quantity of crude and commercial oil and oil products, such as:

- oil;
- gasoline;
- gas condensate;
- fuel, occupying an intermediate place in density between gasoline and kerosene;
- jet fuel, jet kerosene, aviation jet fuel, kerosene;
- diesel fuel, heating oil, fuel oil;
- the lubricating oil of petroleum origin was obtained from distillate oil fractions with a boiling point above 370 °C [5].

Areas of use. The calculator, together with primary transducers of flow, pressure, temperature, density, and humidity, can be used in the enterprises of production, transportation, processing, and storage of oil and oil products [2].

- as part of the oil quantity measuring system or system for measuring the number of oil indicators
- in technical accounting systems.

Advantages. Traditional systems for collecting and processing information (GLONASS) oil quantity measuring systems are 2-level: middle (computer and PLC) and lower level. The CifrOil flow processor makes it possible to reconsider the classical concept of the SIC SICH (processor + computer) since combines in one system device:

• calculator;
• PLC;
• operator workstation;
• site of common time. Unlike other calculators, “CifrOil” is self-sufficient:
• Equipped with a color touch monitor that provides information display and control of the oil quantity measuring system executive electrical equipment;
• there is a memory module that stores fast and retrospective intelligence data for a long time (from four years);
• has a port for communication with a printer, which guarantees the printing of reporting documents;
• optionally it can be equipped with a receiver (satellite) of temporary activation and perform subsystems of the Universal Time Server, which allows you to adjust the system time, both your own and network providers, reaching an activation accuracy of 10 μs (when using a 1PPS signal) and 10 ms (when using GLONASS/GPS data);
• has high accuracy. Wide range capacitive level sensors for a wide range of liquids.

Functions. Main calculator systems:

• collection and processing of information from flow sensors, temperature, pressure, density, moisture content, and viscosity;
• control of the reliability of the received information in terms of boundary values, rate of change, and other criteria;
• calculation of oil/oil products accounting parameters and reduction to standard conditions in accordance with GOST R 8.595 and R 50.2.076;

• calculation of summary data for reporting time intervals (2 hours/shift/day) and generation of current reports;

• display of parameters on the built-in touch color display in the form of mnemonic diagrams, graphs, and tables;

• formation of a log of emergency events, including registration of changes in constants, settings, and configuration;

• registration of events and formation of a message protocol;

• differentiation of access rights by passwords;

• correction of system time;

• data transfer to the upper level;

• formation of verification protocols;

• formation of certificates of acceptance and delivery, passports of the quality of oil/oil products;

• possibility of connecting redundant sensors with automatic switching in case of failure;

• support for 100% "hot" redundancy of computers;

• control of electric valves and pumps of the metering unit;

• sampling management [6].

The main principles in the development of the flow processor “CifrOil” were:

✓ openness,
✓ the ability of its further development,
✓ building up the latest functions.

The flow calculator “CifrOil” is a valuable source of data that can be used in solving various information problems. For example, estimation of the volume of production, balance tasks, calculation of the cost of preparing commercial oil, etc.

Information tasks solved by AIS Information support of an oil-producing enterprise covers a very wide range of tasks, the specifics of which are determined primarily by the fact that the enterprise, being the main element of the industry, is on an independent balance sheet, has its own planning bodies, its own forms of accounting and reporting (figure 3).

Figure 3. structures of the two-level system of "CifrOil"

The classification of information tasks can be carried out according to various criteria (by management functions, by standard data processing procedures, etc.). But the considered classifications have significant drawbacks, consisting in a large number of groups, insufficient consideration of the specifics of automated information systems, etc.

Therefore, a combined classification was proposed, which provides for the division of the entire set of information tasks into groups:

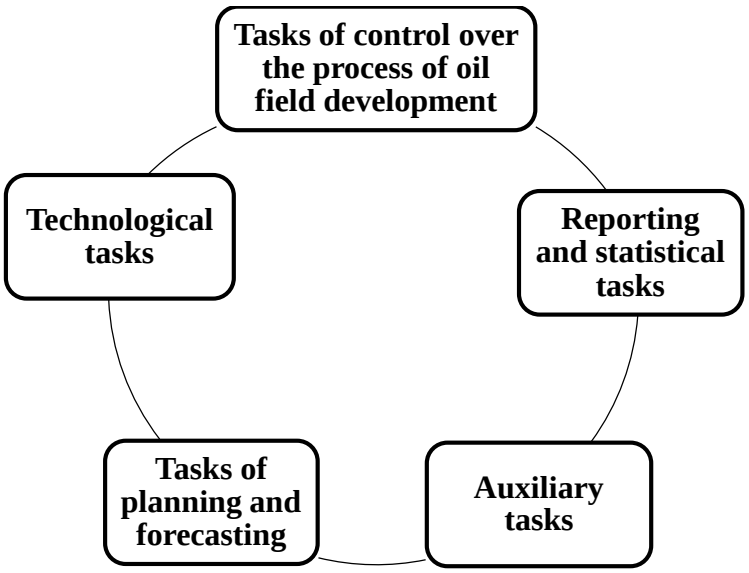

Figure 4. Classification of the entire set of information tasks

To increase the final oil recovery of reservoirs, increase the rate of development, acquire the minimum cost of oil production, regulation of the sale of deposits is carried out. But effective regulation of the process is impossible without proper control over the modulation of oil production indicators.

The automated information system should be entrusted with the settlement of the following goals for monitoring the process of developing petrochemical fields:

Description of the rate of introduction of oil-water contact (OWC), creation of an OWC map, and a map of reservoir watering.

Filtering the results of the survey of production and injection wells and determining the parameters of permeability, hydraulic conductivity, and other reservoir and well parameters.

Also, the structure can be productively used to understand the nature of the separation of reservoir compression, to build isobar maps, and so on.

The solution of technical problems guarantees more prompt receipt of absolute and reliable information characterizing the operation of the oil refining export and transport system, the oil organization unit, and the reservoir pressure maintenance subsystem. Such schemes are the most complex complexes of systems and communications dispersed over a large area and connected hydrodynamically into a single system. In the process of administration of such systems, the tasks of minimizing energy costs become less important. AIS should ensure the delivery of relevant information and the acceptance of such tasks.

The super-tasks of planning and modeling, solved by the scheme, provide the necessary basic data at the right time, on the basis of which long-term and high-speed plans for a mining enterprise can be developed. For example, the important super-tasks of this group are long-term forecasting of oil production, water, and oil in the field, planning the production of oil refining, the tasks of increasing production efficiency, and determining the need for material energy resources.

A number of tasks are assigned to the auxiliary group. The information accumulated by the system characterizes objects whose operation is largely affected by numerous random factors. Therefore, in order to identify patterns, the use of which will increase the efficiency of enterprise management, generalizing processing of accumulated information should be used. To do this, AIS is equipped with algorithms for the statistical processing of oilfield information.

Requirements for a modern AIS Implementation of an AIS at an oil refinery is associated with significant costs, as it is necessary that this system meet modern requirements.

The System Requirements section consists of subsections:

- Requirements for the system as a whole;
- Requirements for the functions performed by the system;
- Requirements for types of collateral [7].

The 1st subsection indicates the requirements for the structuring and functioning of the system, the number and competence of personnel, compliance with ergonomics, security, safety, and operation of the system. All the requirements for maintaining information from unauthorized access, the impact of external factors, and safety in case of breakdowns appear. Compliance with patent purity, standardization, universalization, etc. is also outlined.

In the 2nd subsection, a list of functions and tasks performed in each subsystem is given, the characteristics of time (period) and the accuracy of the implementation of each function, task, or set of tasks, requirements for the quality of their implementation, reliability, and structure of the presentation of output information. The set and criteria of failures for every regulation.

The 3rd subsection sets out instructions for information, cultural, mathematical, multimedia, technical, measuring, organizational, methodological, and other types of support.

Turbine meters are another type of modern and reliable equipment for accounting for petroleum products. Their undeniable advantage is that, despite the relative ease of execution, they can provide a high degree of measurement accuracy - they correspond to an accuracy class of 0.15. In addition, modern manufacturers, at the request of the customer, can provide a lower limit for the operating temperature of such meters -500C and below [8].

The principle of operation of turbine meters is that the speed of rotation of the rotor of the turbine flow converter (TFC) is contactless converted by an electrical radio signal with a frequency commensurate with the rotation speed and, accordingly, the volumetric flow rate of this liquid.

An indisputable convenience in the use of meters of this kind is the ability to store information in the device's own memory, while the configuration of the meter itself can include sensors that provide information output and its storage on a computer.

Conclusion. Thus, IIS, working in conjunction with process control systems, at oil refineries increases the efficiency of operations and revenues by accurately monitoring oil products, tracking operations, increasing the efficiency and reliability of data. In this paper, the IIS of monitoring, acceptance, and sale of petroleum products for the “CifrOil” computer was considered. IIS allows remote control and monitoring of the technical process of receiving and launching fuels and lubricants from the main office. Also, in conjunction with the automated process control system, it is possible to find out the balances in the tanks, receipts, expenses, and any other reporting in real-time. The result of the work of IIS is the successful functioning of the state enterprise, increasing productivity, competently solving many super-tasks, minimizing costs, improving product quality, and increasing safety.

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DEVELOPMENT OF A FUNCTIONAL AND ERGONOMIC NATIONAL BASIC DESIGN OF SPECIAL-PURPOSE CLOTHING

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Anotatsiya: Ushbu maqolada maxsus maqsadli kiyimning funktsional-ergonomik rasional asosiy konstruksiyasini ishlab chiqish haqida so'z boradi. Muallif tenologik ma'lumotlarga tayangan, mavjud ilmiy adabiyotlar asosida muammoni tahlil qilgan va maxsus maqsadli kiyimning funktsional-ergonomik rasional asosiy konstruksiya ishlab chiqishda mavjud o'ziga xosliklarni o'rgangan.

Kalit so'zlar: ergonomik kiyim, Inson-kiyim-muhit tizimi, ergonomik dizayn, 3D skanerlash.

Abstract: This article will talk about the development of a functional-ergonomic national basic design of specially targeted clothing. The author relied on tenological data, analyzed the problem on the basis of available scientific literature, and studied the existing peculiarities in the development of functional-ergonomic national basic design of specially targeted clothing.

Keywords: ergonomic clothing, Man-clothing-environment system, ergonomic design, 3D scanning.

Аннотация: В данной статье пойдет речь о разработке функционально-эргономичной рациональной базовой конструкции спецодежды. Автор опирался на технологические данные, проанализировал проблему на основе доступной научной литературы, изучены существующие особенности в разработке функционально-эргономического рационального базовой конструкции спецодежды.

Ключевые слова: эргономичная одежда, система «человек-одежда-окружающая среда», эргономичный дизайн, 3D-сканирование.

Introduction. Clothing covers more than 80% of the surface of a person and forms together with a person a "Person-clothing-environment" system in which clothing is in constant contact and interaction with the surface of the figure, therefore, such indicators of the quality of clothing as "comfort" and "convenience" are important. Human and industrial product contacts are considered in ergonomics at the biological and psychological levels [4]. During operation, a person has psychological feelings of comfort or discomfort, heat and cold, comfort, pressure on certain parts of the body, which affects fatigue and human performance. Consequently, the creation of ergonomic clothing requires a more complete alignment of the form of clothing with

the anthropometric characteristics of the human body in accordance with ergonomic requirements.

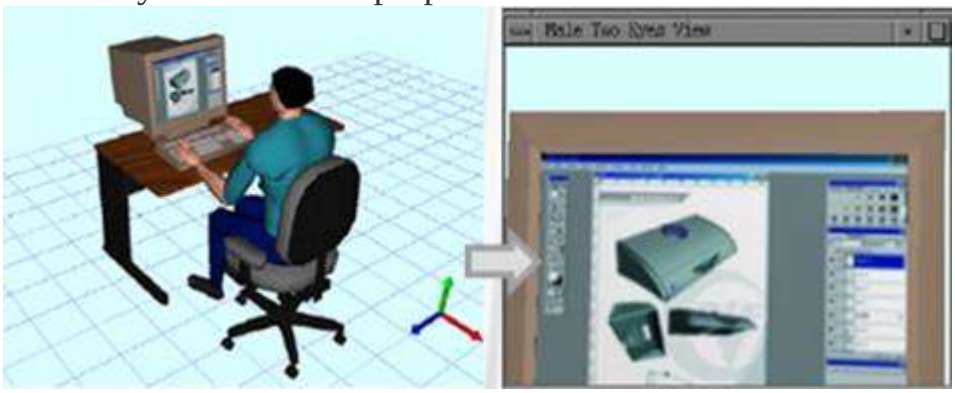
Main part Several approaches have been identified for conducting research and studying the "Man-clothes-Environment" system. One of the main directions is to study the influence of the surrounding space on the operation of clothing. Thus, researchers in Croatia [25] have developed a kinematic method for studying the ergonomics of the worker using three-dimensional video recording, which allows to obtain a cyclogram of movement, and the assessment of physical risk factors is carried out by analyzing the posture and movements realized by the operator during the work.

When studying the ergonomics of the workflow, German researchers developed the technology "CUELA" (Ellesast) (Pic. 1).

Pic. 1. Study of workplace ergonomics using "CUELA" technology (Ellesast)

The essence of this technology lies in the methods of obtaining and analyzing data based on the use of a computer and a "suit" of wireless sensors, which provides an analysis of the movements of an employee during a full working day [19].

Chinese researchers [29] have developed a virtual mannequin to study the workplace in the office and the interaction of clothes with the figure (Pic. 2), consisting of physiological and anthropometric models repeating the poses, reactions and movements of a person, and an algorithm for analyzing the "Man-clothes-environment" system has been proposed.

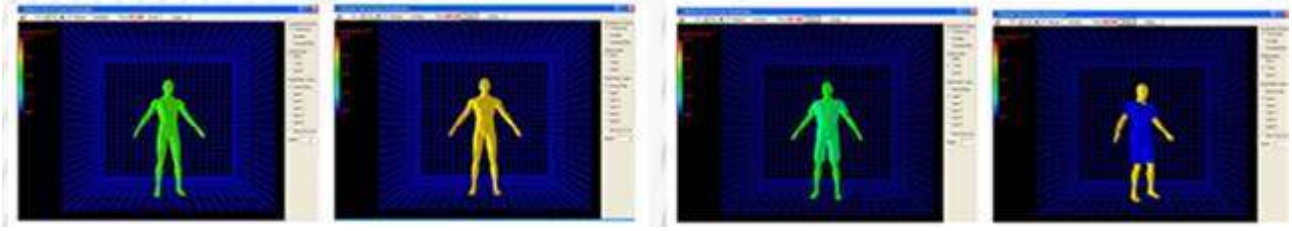


Pic. 2. The result of the workplace simulation and the analysis of the visual observation zone

The interaction of the "Person-clothing-environment" system is described in detail by the authors [23, 26] who noted that "psychological comfort" is provided by the comfortable microclimate conditions of the potezny space, and "physical comfort"

characterizes the degree of adaptability of clothing to a person, i.e. static and dynamic correspondence.

Many foreign authors in order to study the interaction of the "Man-clothing-environment" system have developed mathematical models for the subsequent application of research results in the development of functional clothing to determine increases in freedom of movement, including German researchers (X. Xu, J. Werner, 1997) [37], scientists of the Faculty of Mechanical Engineering of the University of Maribor in Slovenia (J. Gersak, M. Marcic, 2007) [27], American and Chinese scientists conducting joint research (L. Yi, U. Aihua, et. al., 2006) at the Hong Kong Polytechnic University [38] (Pic. 3, a), Chinese scientists (F. Li, Y. Wang, 2013) [30] (Pic. 3, b) from Nanjing University of Aeronautics and Astronautics in China. Such systems allow you to simulate and study the thermal and operational characteristics of products. The advantage of the developed systems is the ability to predict the thermal state of a person, which is an important aspect of comfortable clothing, as well as the possibility of multiple modeling of heat exchange in the "Man-clothing-environment" system in order to improve the design of clothing.



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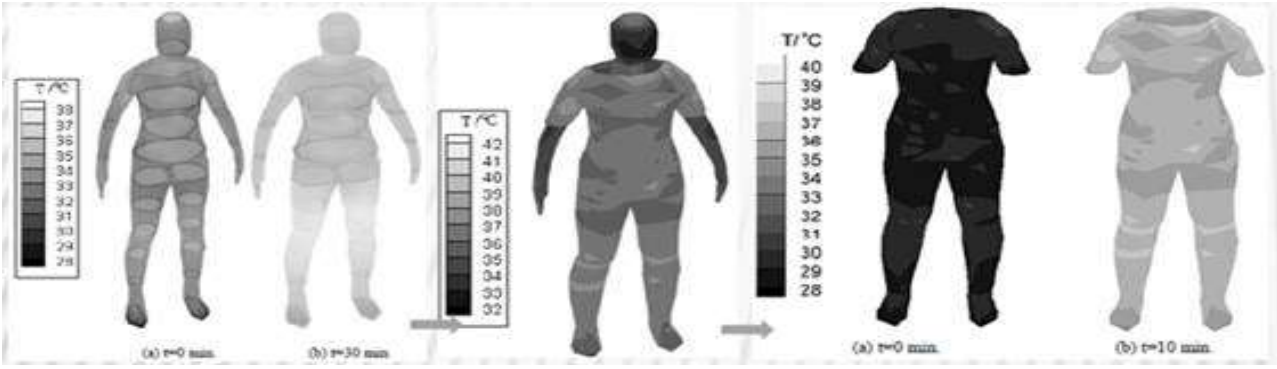

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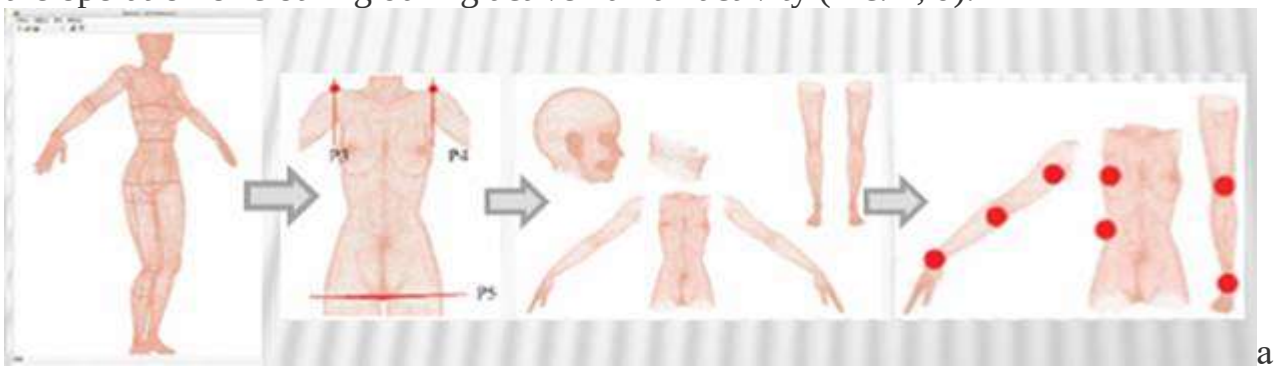
Pic. 3. Virtual environment for studying the interaction of the "Man-clothes-environment" system: a-[38] (L. Yi, U. Aihua, et. Al); b-[30] (F. Li, Y. Wang)

To study the interactions of the elements of the "Man-clothing-environment" system in statics and dynamics, anthropometric [4] and anthropodynamic studies are carried out, respectively, using various contact and non-contact methods. American scientists of the Department of Clothing, Textiles and Interior Design of Kansas State University [28] and Russian researchers [14] recommended finding dynamic effects when performing characteristic types of movements based on studying the operating conditions of the designed clothing.

Currently, contactless measuring systems of three-dimensional scanning have been developed to obtain reliable information about the dimensional characteristics of the human body, both in statics and dynamics. Thus, the development of non-contact measurements during movements is devoted to the research of foreign specialists (Liu

Chi, R. Kennon, 2005) of the Textile University in Manchester [31], Chinese scientists (L. Bing et al., 2010) [21], scientists (Y. Cui et al., 2013) of the British University [24], scientific work of a German scientist (C. Mattman, 2008) of the Zurich Higher School [33] (Pic. 4, d). The 3D scanning system developed at MGUDT [11] makes it possible to simulate in a virtual environment the movements characteristic for the operation of clothing during active human activity (Pic. 4, d).



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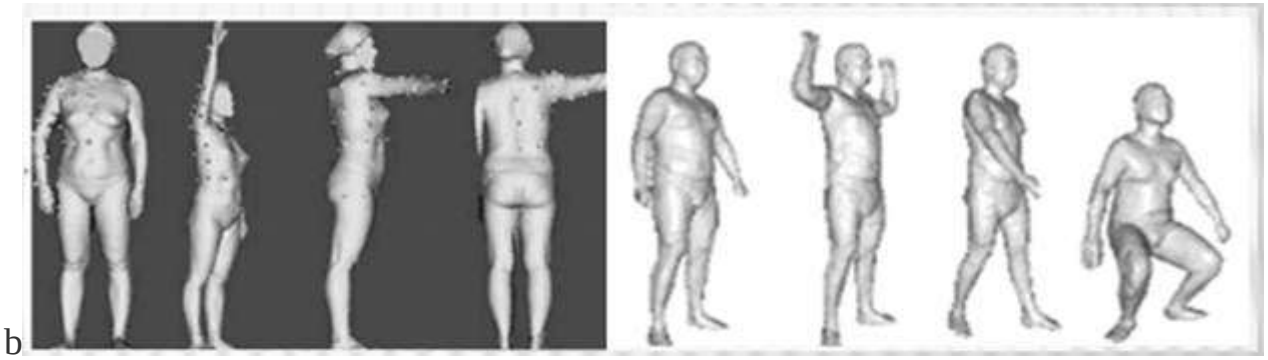

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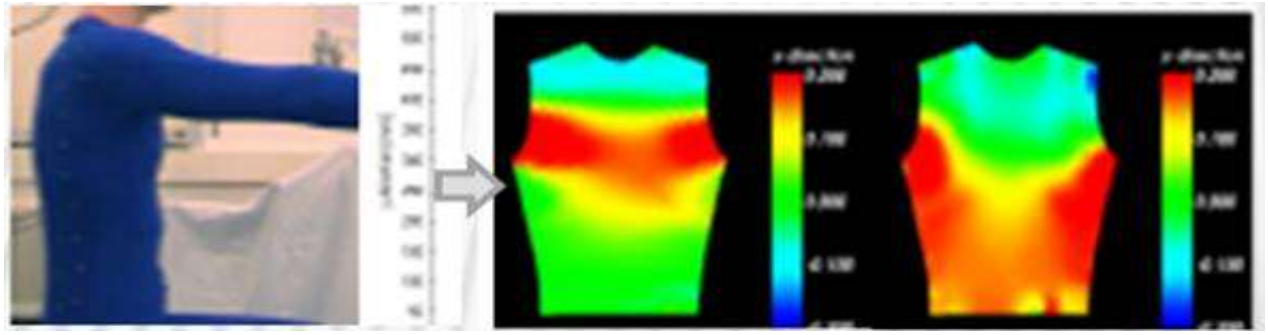

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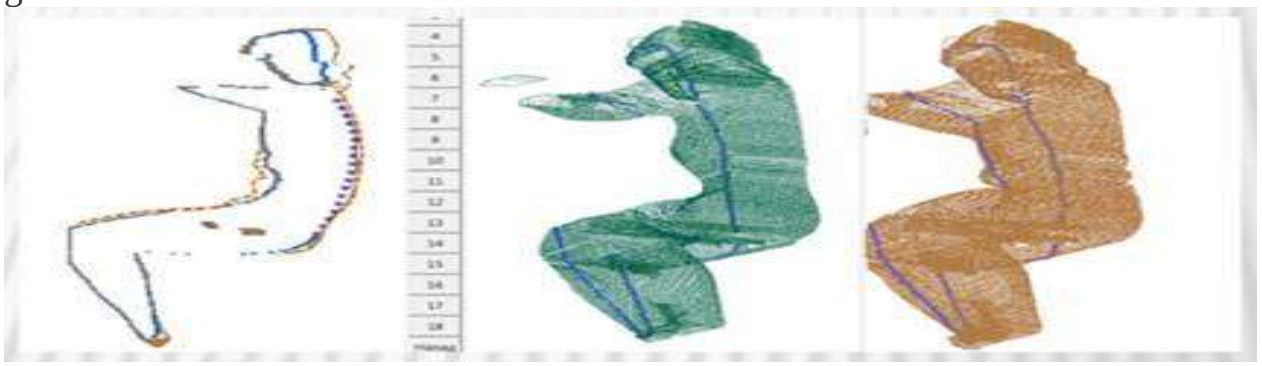

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Pic. 4. The use of modern systems in the study of figures in dynamics: a-[21] (L. Bing et al.); b- [31] (Liu Chi, R. Kennon); c-[24] (Y. Cui et al.); d- [34] (C. Mattman); d- [11] (I. A. Petrosova)

When studying scientific papers, the following methods of designing ergonomic clothing were identified: taking into account the biomechanical characteristics of

movements and calculating the optimal values of design parameters; optimization of design parameters according to ergonomic indicators; application of original design and technological solutions of parts.

The works of E.Ya. Surzhenko are devoted to the problems of increasing the level of ergonomic compliance of special-purpose products. The author [14] proposed a new approach to the design of ergonomic clothing based on the bio-kinematic analysis of the interaction of elements of the "man-clothing" system. This approach provides a rational design with a given level of dynamic compliance, but a satisfactory level of static compliance of clothing [2, 14]. Therefore, the proposed method cannot be applied in the design of household clothing.

Results and Discussions. A separate direction can be distinguished by the ergonomic design of special, sports and children's clothing, the use of structural and technological means to ensure the dynamic compliance of the product with the conditions of their functioning [9, 18]: the use of various sleeve cuts, the use of elastic inserts in stressed areas of clothing, non-sutured sections, folds, gussets, adjustable parts. However, it should be noted that the original design and technological solutions of the parts are used as additional means to increase the dynamic conformity of the product.

Ensuring the ergonomics of structures by optimizing design parameters according to ergonomic indicators were studied in the works of E. B. Kobyakova, V. V. Razmakhnina, N. H. Naurzbayeva [4,13,17]. The essence of this method of obtaining ergonomic clothing is that it is necessary to find such a combination of design parameters at which the level of dynamic conformity of clothing would be maximum. Optimization of design parameters according to ergonomic indicators of dynamic compliance allows you to design clothes with a given level of dynamic compliance, which helps to increase the convenience of the product in operation and reduce material consumption. However, the cost of procedures is comparatively high. Since such an approach to solving the problem of ergonomics of clothing entails large material and labor costs for the production of layouts and for conducting studies of their dynamic compliance with a given set of movements.

In general, an analysis of existing methods of designing ergonomic clothing has shown that the methods determining the amount of the minimum necessary increase in the design of clothing have a common disadvantage - the amount of the minimum necessary increase is unevenly distributed over the surface of the figure and are based only on the linear dimensions of the human figure and do not take into account the shape of the surface being dressed.

It should be noted that a new direction is currently developing - the design of virtual systems "figure-clothing", where body scanners are used to digitize the surface of the figure and clothing. Thus, in the works [5, 6, 7, 15], the researchers established the relationship between the design parameters and the values of air gaps at the main anthropometric levels and obtained equations for calculating air gaps depending on the design parameters. However, the correctness of finding the values of constructive additions is questionable, since their values are determined for static and do not take into account ergonomic requirements that affect the comfort of clothing in motion.

An important stage in the design of ergonomic clothing is the assessment of its comfort, both in statics and dynamics. In scientific papers [8, 14, 16, 17, etc.] devoted to solving the problems of improving the ergonomics of the design of household and special clothing, various methods for assessing the static and dynamic compliance of the "man-clothes" system are proposed.

There is a known method for assessing the quality of landing with the help of various adaptations to the dummy and special screens determining the positions of the side, sleeve, side seams, etc. [17]. When assessing the convenience of clothing in dynamics, devices were proposed by E. B. Koblyakova and V. V. Razmakhnin. However, it should be noted that these devices have disadvantages, since the data obtained during the evaluation process are subjective and are measured by devices located at a distance from the object, which leads to a high measurement error.

Conclusion. The rapid development of computer technology and visualization options creates alternatives to traditional methods of landing analysis. Modern sewing CAD systems are equipped with virtual mannequins to visualize the shape of the designed clothing models in order to identify defects in the fit of products [10, 36]. The ability to evaluate both static and dynamic landing defects is implemented in CAD "OptiTex", "Lectra". In addition to the folds and creases on the product, which are reflected directly when the mannequin is "dressed", the developers of these CAD systems provide a special viewing mode that allows you to assess the pressure of clothing on the human body and the tension in the fabric in various areas. Places on the product where mechanical forces (pressure, tension) act are marked with color spots, the saturation of which depends on the magnitude of the force.

At the second stage, the design features of the designed clothing are determined by selecting the values of the shaping parameters, an ergonomic design of clothing for a given target group is developed.

At the final stage, the quality of clothing is assessed using 3D scanning technology, by combining scanned three-dimensional models of figures in and without clothing [12].

Thus, the proposed technology provides the possibility of virtual modeling of the behavior of the "man-clothes" system in statics and dynamics. Provides an accurate determination of the dimensional characteristics and the external shape of the surface of the figure and the surface of clothing in order to evaluate the projected product to the external shape of the consumer's figure, which in turn will lead to rational product designs, and, consequently, an increase in the level of ergonomics of clothing.

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PARA-[DI-1,4-(4,4,4-TRIFLUOROBUTANDION-1,3)]-BENZENE THYOSEMICARBASE AND SYNTHESIS OF COMPLEX COMPOUNDS ON THE BASIS

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Annotatsiya: Ushbu maqolada para-[di-1,4-(4,4,4-triftorbutandion-1,3)]-benzolning tiosemikarbazid bilan reaksiyasi, sintez qilingan tridentat ligandning tuzilishi, tautomeriyasi, oraliq metall ionlari bilan hosil qilgan kompleks birikmalarining tuzilishi fizikaviy tadqiqot usullaridan UB, IQ spektroskopiya usullari yordamida o`rganilgan va tahlil qilingan.

Kalit so'zlar: β-diketon, bis-β-diketon ichki molekulyar vodorod bog' (IMVB), polikarbonil birikma, atsil va tioatsilgidrazonlar.

Аннотация: В данной работе пара-[ди-1,4-(4,4,4-трифторбутандион-1,3)]-бензола реакция с тиосемикарбазидом, строение синтезированного тридентатного лиганда, таутомерия, строение комплексных соединений образующиеся с промежуточными ионами металлов УФ-, ИК-спектроскопии изучены и проанализированы.

Ключевые слова: β-дикетон, бис-β-дикетон, внутримолекулярная водородная связь (IMVB), поликарбонильное соединение, ацил- и тиоацилгидразоны.

Abstract: In this article, para-[di-1,4-(4,4,4-trifluorobutanedione-1,3)]-benzene the reaction with thiosemicarbazide, the structure of the synthesized tridentate ligand, tautomeric form, the structure of complex compounds formed with intermediate metal ions UV-, IR spectroscopy studied and analyzed.

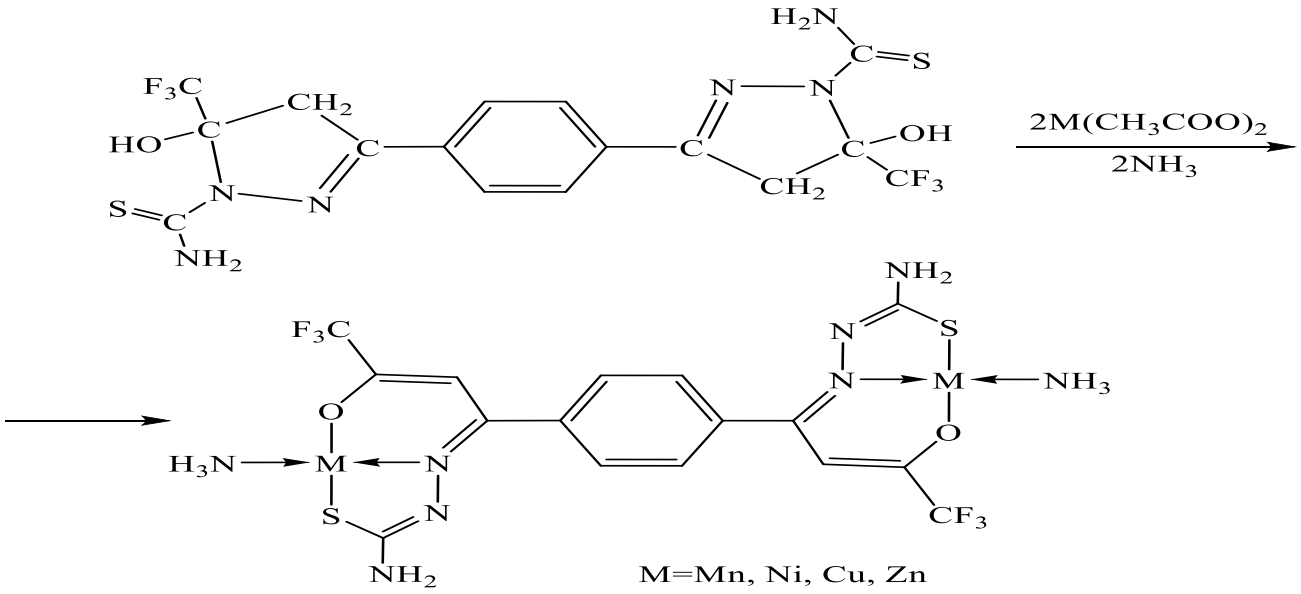
Keywords: β-diketone, bis-β-diketone, intramolecular hydrogen bond (IMVB), polycarbonyl compound, acyl and thioacylhydrazones.

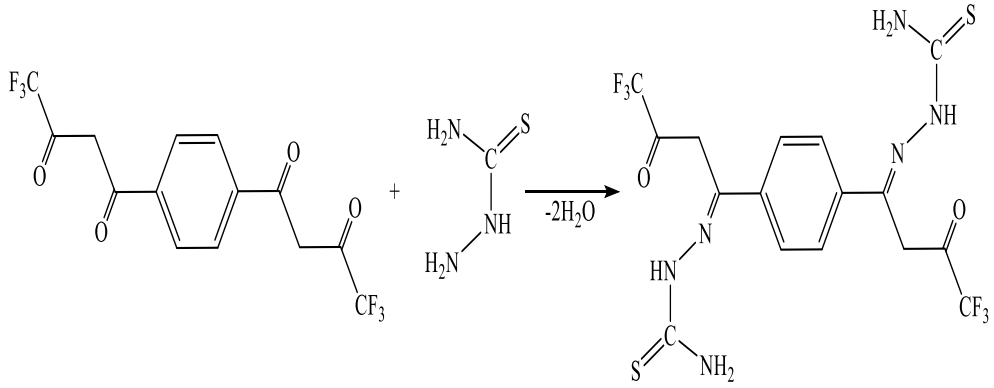
Introduction: Research in the field of complex compounds of acyl and thioacylhydrazones of polycarbonyl compounds with intermediate metals is actively developing in modern coordination chemistry. An important aspect of such complex compounds is that they offer a wide range of applications in various fields of industry and technology (polymerization, hydrogenation, carbonization, etc. in catalytic processes in the metal complex, molecular electronics, creation of magnetically active materials), especially, fluorinated β-diketones, bis-β-ligands based on diketones and their complexes have a huge number of applications. They are used in medicine for the treatment of oncological diseases, as catalysts in industry, as a biostimulator in agriculture, as a fungicide and antibacterial agent, in the quantitative analysis of rare earth metals and in the process of quantitative gas chromatographic determination of their isotopes. In addition, fluorinated N-N0-ethylene-bis-β-aminoenones are used as effective organic optical filters in opening coatings by precipitation of metal-organic chemical vapors [1,8,9,12]. V. I. Filyakova, Ye. Studies by F. Xmara, V. N. Charushins have suggested the use of fluorinated lithium diketonates to synthesize bis-enaminosetones containing several independent coordination centers [1 - 3].

Literature review: The addition of fluoride substitutes improves several properties of the complexes, increases their stability and reduces their tendency to polymerization. The acidity of both primary ligands and complexes rises by fluoridation. In some cases, specific intermolecular interactions occur in the presence of fluorine atoms [2]. As a result of ligand interaction with Ni(II), Cu(II), Zn(II), Mn(II) ions in a ratio of 1: 2, homocystic complexes are formed. A NH_3 solution of metal acetates was used for the reaction, resulting in the synthesis of complex compounds $Ni_2L{\cdot}2NH_3$, $Cu_2L{\cdot}2NH_3$, $Zn_2L{\cdot}2NH_3$, $Mn_2L{\cdot}2NH_3$.

Research Methodology:1g (0.0028 mol) Para- [bis-1,4- (4,4,4-trifluorobutandion-1,3)]-benzene and 0.5 g (0.0056 mol) thiosemicarbazide were measured and dissolved in methanol. The reaction mixture was heated in a water bath to 30-40°C and stirred regularly. After 3 days, the solvent was removed in a vacuum under low pressure and dried outdoors. . The resulting substance is well soluble in methanol, ethanol, but poorly soluble in isopropyl alcohol at room temperature. In the experiments, ligand and metal ions were mixed in a 1:2 ratio of 0.25 g (0.0005 mol) with para- [bis-1,4-4,4,4-trifluorobutandion-1,3] -benzene thiosemicarbazone and 0.2 g (0.001 mol) copper acetate was dissolved in NH_3 water. While heating the ligand in a water bath, we poured an ammonia solution of copper acetate on top. The green copper complex $Cu_2L{\cdot}2NH_3$ was formed. Were synthesized 0,3 g. 88%.

In the same way, a solution of para- [bis-1,4-4,4,4-trifluorobutandion-1,3]-benzene thiosemicarbazone and zinc acetate, nickel acetate and manganese acetate in ammonia was mixed in a 1:2 ratio, homobinuclear complex compounds containing $Zn_2L{\cdot}2NH_3$, $Ni_2L{\cdot}2NH_3$, $Mn_2L{\cdot}2NH_3$ were synthesized. The resulting metal complexes dissolve well in methanol at room temperature when slightly heated in ethanol and are poorly soluble in benzene and chloroform. The yield of the reaction and the results of the element analysis are given in Table 1.



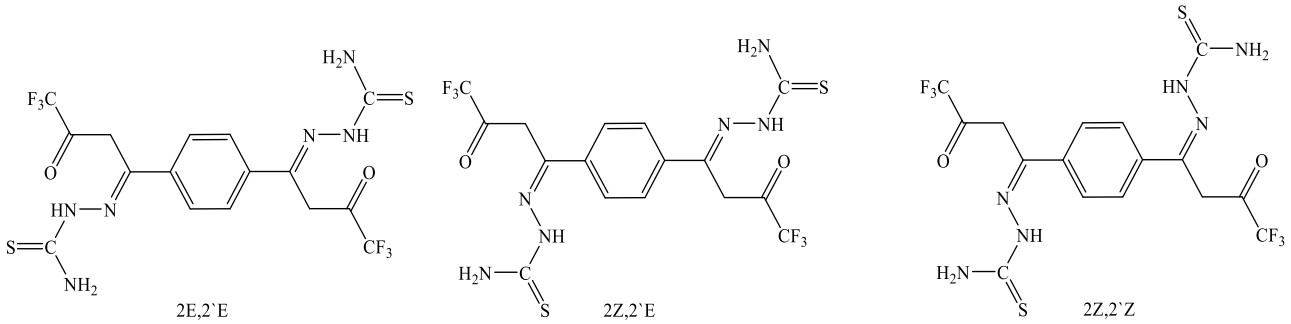


$C_{16}H_{14}O_2S_2N_6F_6$ is an orange-colored substance, soluble in ethyl alcohol. It is a bis-tridentate ligand and can take various tautomeric forms.

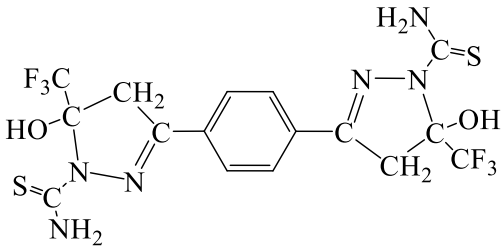
Table 1

Productivity of synthesized substances and results of element analysis.

Compound	Yield, %	Result, %				Bruto formula	Calculated, %			
		M	C	H	N		M	C	H	N
I	86	-	47.09	2.11	-	$C_{14}H_8O_4F_6$	-	47.47	2.28	-
II	71	-	37,89	2,65	16,56	$C_{16}H_{14}O_2S_2N_6F_6$	-	38.4	2.82	6.79
III	80	16,95	29,46	3,02	16,91	$C_{16}H_{14}O_2S_2N_6F_6Mn_2$	17.05	29.82	3.13	17.05
IV	82	17,84	29,22	2,97	17,07	$C_{16}H_{14}O_2S_2N_6F_6Ni_2$	18.01	29.48	3.09	17.19
V	88	19.09	28,96	2,89	16,79	$C_{16}H_{14}O_2S_2N_8F_6Cu_2$	19.21	29.05	3.05	16.94
VI	76	19,49	28,78	2,86	16,72	$C_{16}H_{14}O_2S_2N_6F_6Zn_2$	19.66	28.89	3.03	16.84



A B C



D

Regardless of the tautomeric structure of the ligand, when they interact with metal acetates, complex compounds $M_2L \cdot 2NH_3$ are formed, in which the ligand becomes a ring-chain tautomer and is deprotonated four times. During the formation of the complex, there happens the regeneration of the linear rehydration (A) in the ligand (oxyazine-enhidrazine) which is in the form of the cyclic 5-hydroxy-2-pyrazoline (D).

Analysis and results: IR spectra from samples of synthesized substances on the instrument of IRTracer-100 (SHIMADZU CORP., Japan, 2017) recorded signals in the area of 400-4000 cm^{-1} using the MIRacle-10 diamond / ZnSe prism.

The following oscillation frequencies were recorded in the IR spectrum of the para- [bis-1,4- (4,4,4-trifluorobutandion-1,3)]-benzene molecule: The valence oscillation frequency of the CH bond is n (CH) 3124 cm^{-1}, The valence oscillations of the carbon-oxygen bond in the enol fragment n (CO) 2360 cm^{-1}, the oscillation frequencies in the area ν C=O) 1558 cm^{-1} to the carbonyl group indicate the presence of a free C=O group adjacent to CF_3. Slightly weak intensity signals of deformation oscillation frequencies of O-H bonds in the enol fragment were recorded in the area δ_w(O-H)=1456 cm^{-1}. 1240 cm^{-1} valence oscillations of the bond adjacent to the aromatic ring in area, C-C bond-specific valence oscillations in the aromatic ring 1199 cm^{-1}, 1105 cm^{-1}, 1074 cm^{-1} fields, valence of the C-F bond vibration frequencies were observed in the area of ν (C-F) 1016 cm^{-1}, 814 cm^{-1}, 798 cm^{-1}. Deformation oscillations of the C-F bond δ_w (C-F) were recorded in the area of 690 cm^{-1}, 582 cm^{-1}, 503 cm^{-1} (Figure 1). Based on IR spectral data, the presence of an intramolecular hydrogen bond (IMVB) in the para- [bis-1,4-(4,4,4-trifluorobutandion-1,3)]-benzene molecule was proved [4, 5,6,7,8].

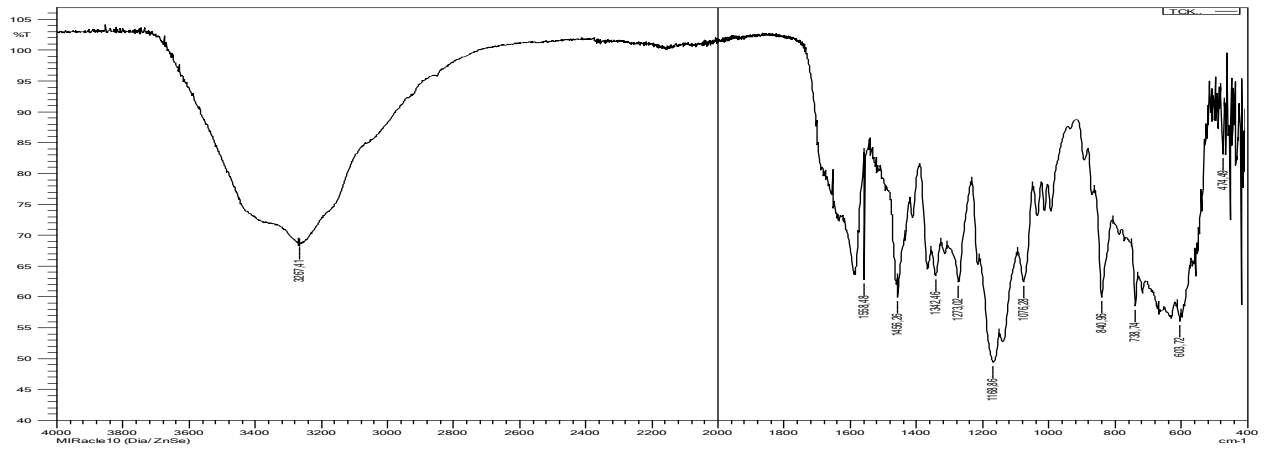


Figure 1. IR spectrum of para- [bis-1,4- (4,4,4-trifluorobutandion-1,3)] - benzene thiosemicarbazone molecule

The composition and structure of the new organic ligand were determined by element analysis and UV and IR spectroscopy. The absorption frequency n (C=O) in the 1558 cm^{-1} region of the IR spectrum of the synthesized ligand proves the presence of a free C=O group adjacent to CF_3. In the spectrum, the valence oscillations of the $\nu_{(N-H}$ bond appear in the 3440 cm^{-1} region, and in the high frequency 3267 cm^{-1} region, hydrazine fragment's the oscillation lines ν_s, ν_{as} characteristic of the N-H. Deformation oscillations' signals of the C-F bond were recorded in the area of (δ_w) 738-603 sm^{-1} (Figure 1) [10,11].

Valence oscillations which are specific to Zn-N and Zn-O in the 609-536 cm^{-1} region in the IR spectrum of Zn(II) complex synthesized on the basis of para-[bis-1,4-(4,4,4-triftorbuandion-1,3)]-benzene thiosemicarbazone confirm that the ligand is in coordination with the nitrogen, sulfur, and oxygen atoms. The specific absorption of the NH_3 molecule, coordinated in area 3404-3342 cm^{-1}, confirms the flat-square structure of the molecule (Figure 3) [11-12].

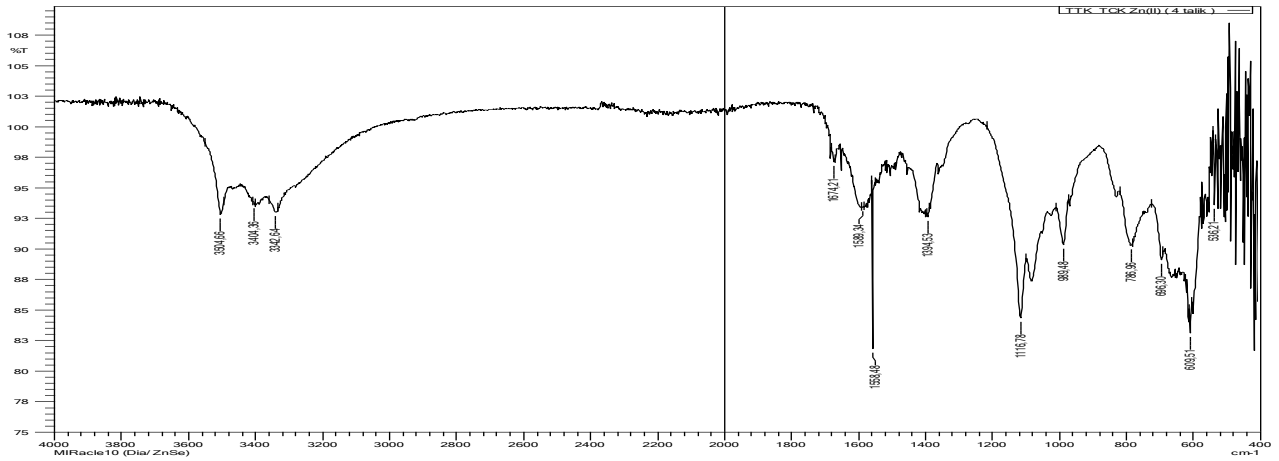


Figure 2. IR spectrum of para- [bis-1,4- (4,4,4-trifluorobutandion-1,3)] - benzene thiosemicarbazone Zn (II) complex compound

Para-[bis-1,4- (4,4,4-trifluorobutandion-1,3)]-benzene thiosemicarbazone molecule contains four potentially moving protons. The fact that the IR spectrum of the complex formed by the ligand with the ion Zn(II) does not contain signals specific to groups $\nu_{(C=O)}$ and $\nu_{(C=S)}$ proves our point. Moreover, the intense signals of NH_3

molecules coordinated in the 3404 and 3342 cm^{-1} domains and the appearance of the Zn-O bonds' signals in the 609-536 cm^{-1} regions prove once again that our idea is correct.

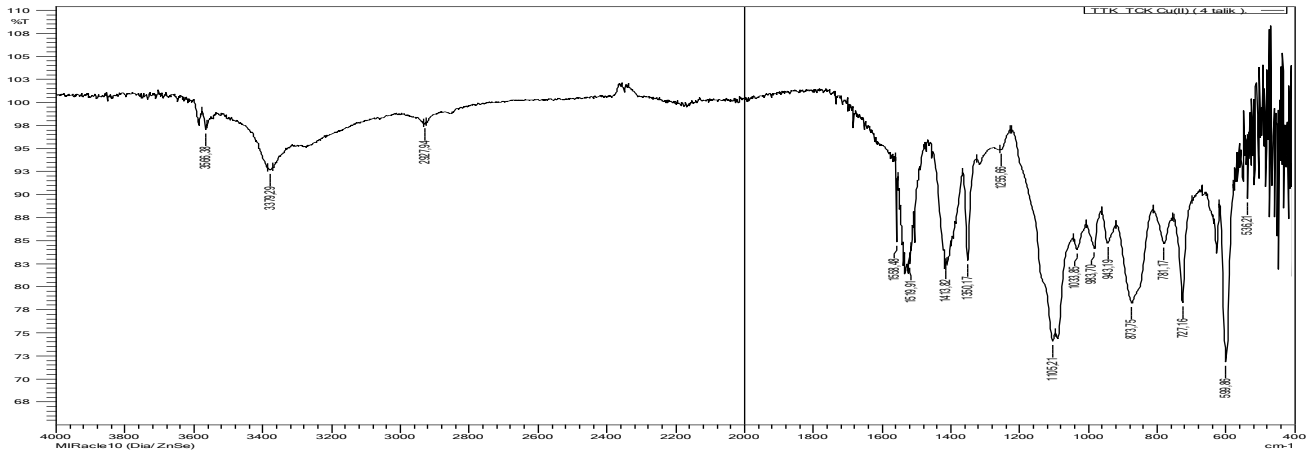


Figure 3. IR spectrum of para- [bis-1,4- (4,4,4-trifluorobutandion-1,3)] – benzene thiosemicarbazone Cu (II) complex compound

Para-[bis-1,4- (4,4,4-trifluorobutandion-1,3)]-benzene thiosemicarbazone gave signals in the $\nu_{(C=N)}$ 1456 cm^{-1} region of the valence oscillations of the C=N bond in the IR spectrum. The shift of the Cu(II) complex compound of this ligand to a weak field in the IR spectrum N=C-C=N (1432 sm^{-1}) 24 sm^{-1} confirms that the amide and diketone parts of the molecule are coordinated with two oxygen atoms, as well as the metal ion of the nitrogen atom azomethin.

While being analyzed the IR spectrum of Para-[bis-1,4- (4,4,4-trifluorobuandion-1,3)]-benzene thiosemicarbazone complex compounds Ni(II) and Mn(II), Intensive valence oscillation frequencies of metal oxygen bonds and the coordinated ammonia molecule were recorded in the areas 582cm^{-1} as well as 600 cm^{-1} and 3350-3340 cm^{-1} respectively. (Table2)

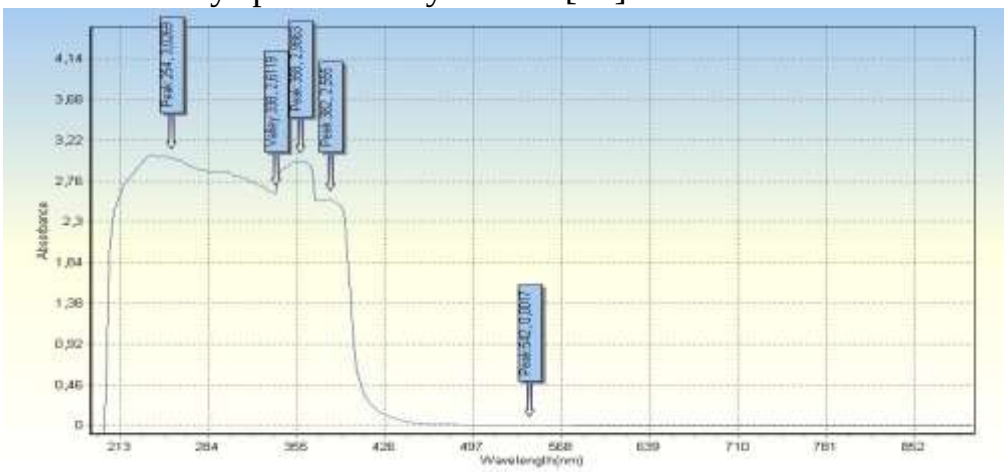
Table 2

Basic oscillation frequencies in the IR spectra of the obtained substances (cm^{-1})

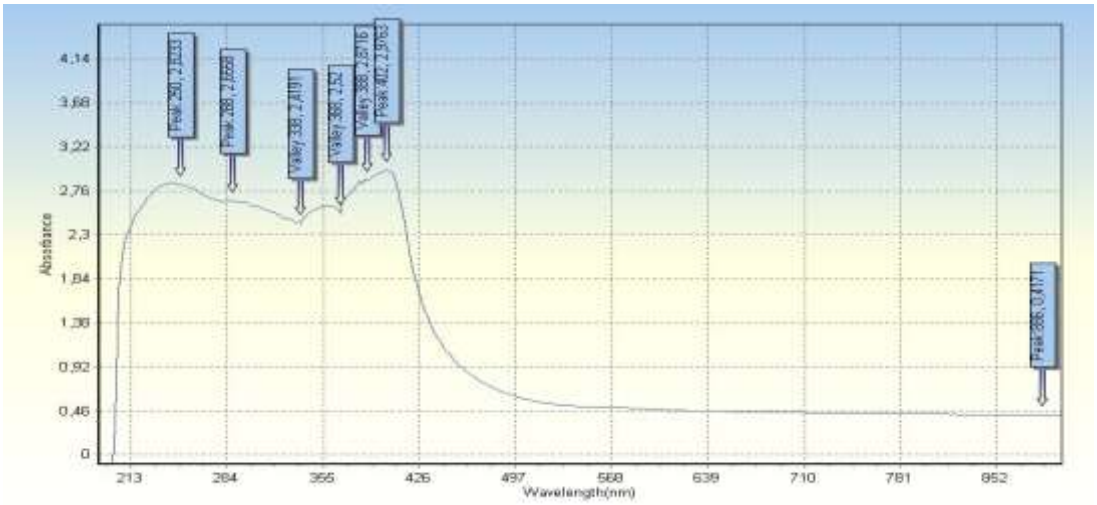
№	Formula of compound	$\nu_{(C-H)}$	$\nu_{(O-H)}$	$\nu_{(C=O)}$	$\nu_{(N-H)}$	$\nu_{(C-O)}$	$\nu_{(C=N)}$	$\nu_{(N-N)}$	$\nu_{(C-S)}$	$\nu_{(M-O)}$	ν_{NH_3}
1	$C_{14}H_8O_4F_6$	3124	1456	1558	3480	2360	-	-	-	-	-
2	L^1	3267	-	1645	3440	-	1456	1076	840	-	-
3	$Zn_2L^1.NH_3$	2915	-	-	3504	1394	1589	1080	786	609	3342
4	$Cu_2L^1.NH_3$	2927	-	-	3556	1350	1413	1105	873	599	3379
5	$Ni_2L{\cdot}2NH_3$	2920	-	-	3600	1307	1450	1172	866	582	3350
6	$Mn_2L{\cdot}2NH_3$	2880	-	-	3490	1284	1463	1136	783	600	3340

To study the optical properties of the synthesized substances, UV spectra were obtained from their solutions in obsolete ethanol (Figure 4,5,6). In the analysis of the obtained UV spectra, the absorption maxima of the starting material specific to the C=0 carbony group were recorded at 254 nm and the signals corresponding to the aromatic ring at 338, 358, 382 nm. Batachronic displacement was caused by chromophore groups in the acltylthiosemicarbazone molekule formed by two renewed (enolated)

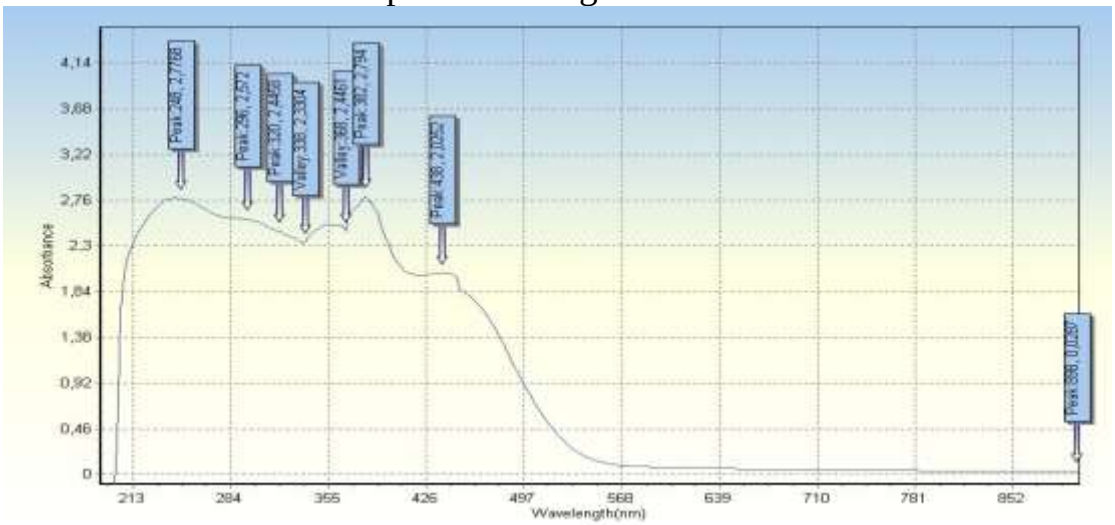
oxygen atoms of the tetracarbonyl compound and a thiosemicarbazide molekule, which was confirmed by spectral analysis data [13].



Picture 4. Spectrum of para-[di-1,4-(4,4,4-trifluorobutandion-1,3)]-benzene in ethanol



Picture 5. UV spectrum of ligand in ethanol



Picture 6. UV spectrum of $Cu_2L \cdot 2NH_3$ complex compound in ethanol

Conclusion: Synthesis of thioacyl hydrazides of fluorinated polycarbonyl compounds allows to obtain new coordination compounds. Over the next decade, the synthesis of 3D metal complexes has been further developed, with the help of

fluoridation of β-bis-diketones, their volatility and stability, the acidity of ligands and complexes increases. The tendency to polymerization is reduced. The obtained substances were studied by physical research methods using UV and IR spectroscopy and we proved the flat quadratic structure of the molecule by matching the complex compounds $M_2L{\cdot}2NH_3$ to the general formula and recording the valence oscillations specific to the ammonia molecules coordinated in the IR spectra.

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SYNTHESIS AND NMR SPECTROSCOPIC STUDY OF HYDRAZONE DERIVATIES OF FERROCENOYLACETONE AND THEIR COMPLEXES

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Annotatsiya: Klyayzen kondensatsiyasi orqali β-diketon – 1-ferrotsenilbutandion-1,3 olindi. Monokarbon kislota gidrazidlari va ferrotsenoilatsetonning o‘zaro ta’sirlashuvi natijasida gidrazonlar (H_2L) va ular asosida oraliq metall ionlarining komplekslari sintez qilindi. Olingan birikmalar spektroskopik usullarda o‘rganildi. Tadqiqotlar natijasiga ko‘ra, H_2L eritmada gidrazon, α-oksiazin va halqali 5-oksipirazolin kabi tautomer shakllarida uchraydi. Spektroskopik tadqiqotlar natijalariga ko‘ra kom-plekslar tekis-kvadrat tuzilishiga ega ekanligi va ularda ikki marta de-protonlangan ligand qoldig‘i metall atomi bilan ikkita kislorod atomi hamda gidrazon fragmentining azot atomi orqali tridentat koordinatsion bog‘langani hamda tekis kvadrat trans-N_2O_2-koordinatsion qurshovining to‘rtinchi o‘rnini ammiak molekulasi egallagani aniqlandi.

Kalit so‘zlar: gidrazon, ferrotsenoilatseton, Klyayzenning murakkab efir kondensatlanishi, tautomeriya, YaMR spektroskopiya

Аннотация: Нами конденсацией Кляйзена получен β-дикетон – ферроценоилацетон. Синтезированы гидразоны монокарбоновых кислот (H_2L) взаимодействием гидразидов карбоновых кислот с ферроценоилацетоном. На их основе полу-чены комплексы с переходными металлами. Синтезированные соединения изучены спектроскопическими методами. Результаты исследований показали, что H_2L в растворе существует в виде таутомерной смеси: гидразонной, енгидразинной и циклической 5-оксипиразолиновой формах. По результатам спектроскопических исследований комплексам приписано плоско-квадратное строение, где дважды депротонированный остаток лиганда тридентатно координирован атомом металла через два атома кислорода и атом азота гид-разонного фрагмента. Четвертое место в плоском квадрате транс-N_2O_2-коор-динационного узла занимает молекула аммиака.

Ключевые слова: гидразон, ферроценоилацетон, сложноэфирная конденсация Кляйзена, таутомерия, ЯМР спектроскопия

Abstract: We obtained β-diketone – ferrocenoylacetone by Kleisen condensation. Hydrazones of monocarboxylic acids (H_2L) were synthesized by the interaction of hydrazides of carboxylic acids with ferrocenoylacetone. On their basis, complexes with transition metals were obtained. The synthesized compounds were studied by spectroscopic methods. The research results showed that H_2L in solution exists in the form of a tautomeric mixture: hydrazine, enhydrazine and cyclic 5-hydroxypy-razoline forms. According to the results of spectroscopic studies, the complexes were assigned a planar-square structure and in them the doubly deprotonated ligand residue is coordinated by a metal atom through two oxygen atoms and a nitrogen atom of the hydrazone fragment. The fourth place in the flat square of the trans-N_2O_2-coordination site is occupied by the ammonia molecule.

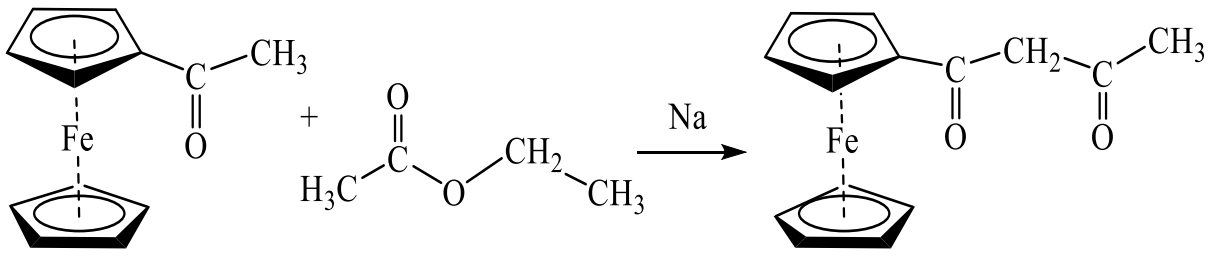
Keywords: hydrazone, ferrocenoylacetone, Claisen ester condensation, tautomerism, NMR spectroscopy

Introduction: Ferrocene is a unique compound in terms of chemical and thermal stability, as well as the possibility of direct application in various organic reactions. This is due to its “sandwich” structure, which is a three-dimensional aromatic system.

Literature review: Thus, many ferrosene-containing compounds are widely studied as new materials [1] and used in coordination chemistry [2]. Currently, a huge number of studies are being carried out to study the biological activity of ferrocene derivatives [3]. A special degree of biological activity is inherent in hydrazone derivatives of ferrocene, which is due precisely to their chelating ability. Numerous experiments have established that the use of molecular and intracomplex compounds based on ferrocene-containing derivatives of trace elements, such as copper, nickel and zinc, leads to an improvement in the germination of plant seeds. It is a potent pesticide and has a beneficial effect on the growth and development of plants. It has been established that the stimulating properties of complex compounds depend on the nature of the metal, methods of coordination of ligands, as well as the chemical composition and geometric structure of the complexes.

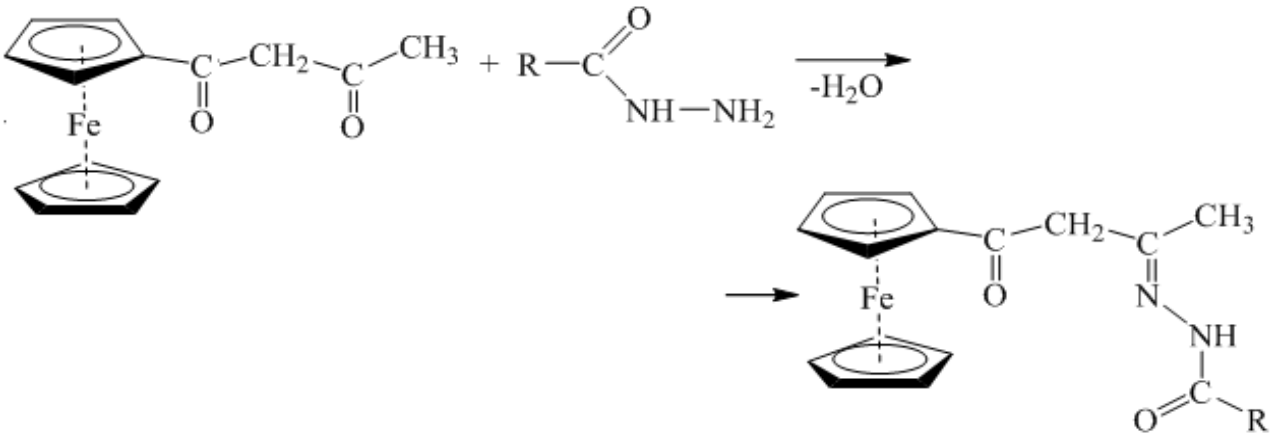
Research Methodology: To expand the range of tridentate chelating ligand systems containing ferrocene fragments; we have synthesized new ligands HL^1- HL^6.

At the first stage of the synthesis, we performed the Claisen ester condensation of monoacetylferrocene with ethyl acetate [4, 5, 6, 7, 8]. The β-dicarbonyl derivative of ferrocene, 1-ferrocenylbutanedione-1,3 (**I**) (ferrocenoylacetone), was synthesized according to the following reaction scheme:



I

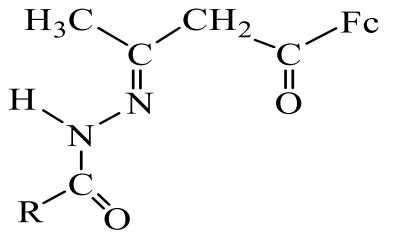
New ligands H_2L^1 - H_2L^6, respectively, were synthesized by the interaction of alcoholic solutions of equimolar amounts of 1-ferrocenylbutanedione-1,3 with alcoholic solutions of acetylhydrazide, benzoylhydrazide, *para*- and *meta*-nitrobenzoylhydrazides, and hydrazides of 5-bromosalicylic and phenylacetic acids, respectively.



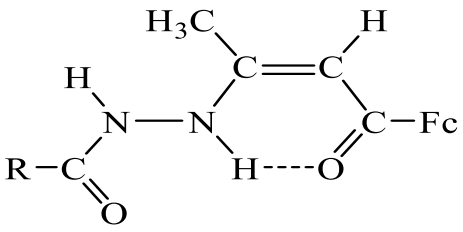
II

R=CH_3 (H_2L^1), C_6H_5 (H_2L^2), *м*-NO_2-C_6H_4 (H_2L^3)), *n*-NO_2-C_6H_4 (H_2L^4), 2-OH-5-Br-C_6H_3 (H_2L^5), $C_6H_5CH_2$ (H_2L^6).

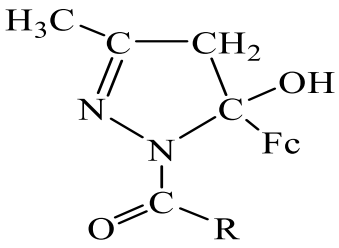
The presence of a hydrazone group in compound **II** suggests wide possibilities for tautomerism. It can be assumed that at least three tautomeric forms can exist for it: hydrazone (A), enhydrazine (B), and cyclic pyrazoline (C) forms. In addition, configurational isomerism should also be taken into account for them [3, 9].



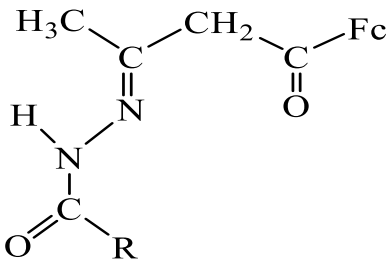
A_Z



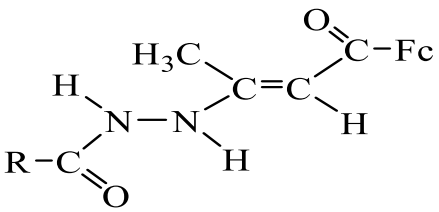
$Б_Z$



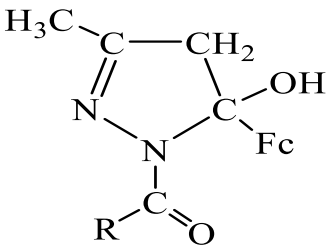
B_Z



A_E



$Б_E$



B_E

Analysis and results: The composition and structure of the obtained ligands were studied by elemental analysis and spectroscopic methods.

Table 1.

Yields, melting points, and results of elemental analysis of ferrocenoylacetone condensation products with monocarboxylic acid hydrazides (H_2L^1- H_2L^6)

Com-pound	Output,%	$T_{пл.}$°C	Gross-formula	Found/Computed, %			
				C	H	N	Fe
H_2L^1	49	167-169	$C_{16}H_{18}N_2O_2Fe$	58,31/58,89	5,37/5,52	8,65/8,58	17,22/17,17
H_2L^2	43	150-152	$C_{21}H_{20}N_2O_2Fe$	64,76/64,95	5,18/5,16	7,19/7,22	14,66/14,43
H_2L^3	65	153-155	$C_{21}H_{19}N_3O_4Fe$	58,1/58,2	4,4/4,39	9,59/9,7	12,73/12,93
H_2L^4	49	157-158	$C_{21}H_{19}N_3O_4Fe$	58,1/58,2	4,4/4,39	9,59/9,7	12,73/12,93
H_2L^5	52	131-133	$C_{21}H_{19}N_2O_3BrFe$	51,99/52,17	4,12/3,93	5,62/5,8	11,12/11,6
H_2L^6	54	179	$C_{22}H_{22}N_2O_2Fe$	65,99/65,67	5,42/5,47	6,95/6,96	13,98/13,93

We recorded the ^{1}H NMR spectra of the H_2L^1-H_2L^6 ligands in solutions (Table 1). For example, in the ^{1}H NMR spectrum of a solution of the compound H_2L^2 in DMSO-d_6+CCl_4 taken after preparation and reflecting the structure of the substance in the solid state, a set of signals corresponding to the hydrazone structure is observed. In this case, the proportion of hydrazone increases when DMSO-d_6+CCl_4 is used as a solvent compared to other solvents. The ^{1}H NMR spectrum of the H_2L^2 ligand contains a set of singlet signals at δ 2,67; 4,602 and 11,45 ppm, assigned by us to the protons of the methyl, methylene group and N–H amide bond. The low field position of the last signal indicates configuration B, where the formation of a chelate hydrogen bond between the N–H group and the carbonyl group is possible. The position of the signals and their intensity are consistent with the hydrazone structure of A. Thus, for the H_2L^2 compound, it is 80% in this case. Proton signals of cyclopeantadienyl rings were registered at δ 4,23; 4,27 and 4,87 ppm The spectrum shows a set of multiple signals centered at δ 7,10; 7,76 and 8,05 ppm, with a total intensity of 5H, assigned by us to the protons of the aromatic ring. The H_2L^2 ligand is also in the hydrazone – 5-hydroxypyrazoline equilibrium. In the ^{13}C NMR spectrum of the ligand, the signal of the carbon atom in the position of the 5-hydroxypyrazoline ring lies at δ 94,90 ppm and has a singlet form.

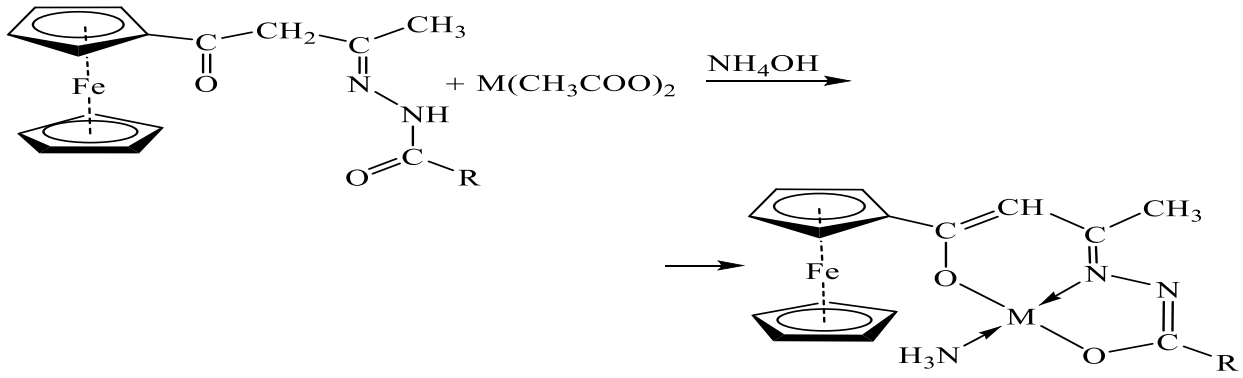
Table 2.

^{1}H NMR parameters of H_2L^1-H_2L^6 ligands in solution DMCO-d_6+CCl_4 (δ, м.д.)

Compound	CH_2	CH_3	C_6H_5	Fc

H_2L^1	3,58;	2,05	–	4,99; 4,55; 4,18
H_2L^2	4,602	2,67	7,10; 7,76; 8,05	4,23; 4,27; 4,87
H_2L^3	2,12	2,83	7,45; 7,55; 7,96	4,95; 4,57; 4,31
H_2L^4	3,30	2,58	7,35; 7,56; 8,02	4,78; 4,31; 4.10
H_2L^5	3,56; 3,75	2,40	7,50; 7,95	4,68; 4,38; 4,22
H_2L^6	3,02	2,12	–	4,99; 4,55; 4,26
H_2L^7	2,12	2,83	7,46; 7,57; 7,95	4,45; 4,57; 4,31

By mixing alcoholic solutions of ligands of the H_2L type and an aqueous ammonia solution of $M(CH_3COO)_2$, in an equimolar ratio, complex compounds of the composition $ML{\cdot}NH_3$ were obtained. The results of elemental analysis and consideration of the spectra allowed us to propose the following mononuclear structure for these complexes **III**:



III

M=Cu(II), Ni(II) and Zn(II)

R=CH_3 ($ML^1{\cdot}NH_3$), C_6H_5 ($ML^2{\cdot}NH_3$), *м*-NO_2-C_6H_4 ($ML^3{\cdot}NH_3$), *о*-NO_2-C_6H_4 ($ML^4{\cdot}NH_3$), 2-OH-5-Br-C_6H_3 ($ML^5{\cdot}NH_3$), $C_6H_5CH_2$ ($ML^6{\cdot}NH_3$).

The diamagnetic properties and good solubility of the synthesized nickel (II) and zinc (II) complex compounds based on the H_2L^1-H_2L^6 ligands in solvents such as chloroform, DMSO, and DMFA allowed us to study them by ^1H NMR spectroscopy. The data of ^1H NMR spectra and their diamagnetism indicate a planar-square structure of the resulting complexes in solution. It should be noted that the ^1H NMR spectra of the synthesized complexes differ strongly from the spectra of the corresponding starting ligands. Consider, as an example, the ^1H NMR spectrum of the $ZnL^3{\cdot}NH_3$ complex (Fig. 1). Singlet signal at δ 2, 31 ppm refers to three protons of the CH_3 group. The signal from the (5H) protons of the unsubstituted cyclopentadiene ligand was recorded as a multiple signal at δ 4, 07-4, 41 ppm. The proton signals of the substituted cyclopentadiene ring are shifted downfield. Showing chemical shifts of 4, 49 (2H, *о*-C_5H_4) and 4,27 (2H, *м*- C_5H_4) ppm. In the region of weak fields, the multiple signals at 7, 68; 7,78 and 7,87 with a total intensity of four protons are due to the protons of the phenyl ring of the *м*-nitrobenzhydrazide fragment. The introduction of a strong electron-withdrawing NO_2-group in the $ZnL^3{\cdot}NH_3$ complex causes a downfield shift of the proton signals in the spectrum, which was to be expected. A broadened low-intensity signal from the protons of the coordinated ammonia molecule is recorded in the ^1H NMR spectrum at δ 12 ppm. The results of the study of ^1H NMR spectra allow

us to conclude that the obtained complex com-pounds of structure **III** have a flat-square structure. This conclusion follows from consideration of the ^{13}C NMR spectrum (Fig. 2). The ^{13}C NMR spectrum of the $ZnL^{3}\cdot NH_3$ complex showed signals at δ 39,524; 68,669; 69,672; 70,195; 81,299; 96,48; 118,554; 121,859; 130,397; 193,020 ppm.

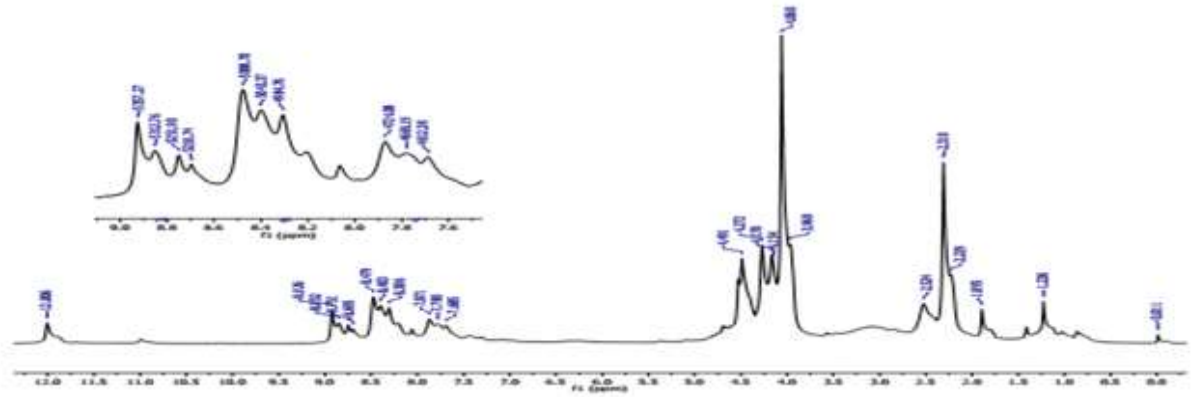


Fig. 1. ^{1}H NMR spectrum of the $ZnL^{3}\cdot NH_3$ complex in DMSO-d_6+CCl_4 solution.

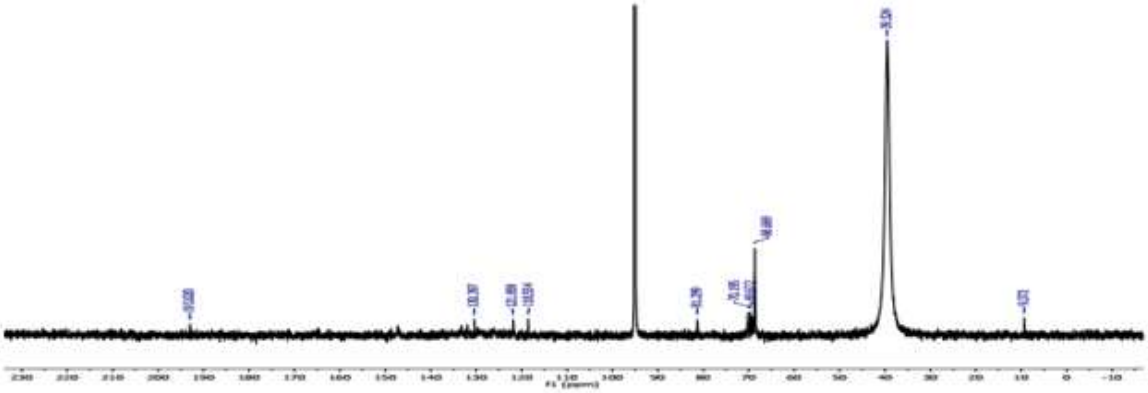


Fig. 2. ^{13}C NMR spectrum of the $ZnL^{3}\cdot NH_3$ complex in DMSO-d_6+CCl_4 solution.

In the ^{1}H NMR spectrum of the $NiL^{5}\cdot NH_3$ complex, in contrast to the data known in the literature, the signals of protons containing Br-, OH-substituents in the benzene ring of the aroylhydrazide fragment appear somewhat differently. The parameters of the ^{1}H NMR spectra of solutions in deuterated DMSO-d_6+CCl_4 complexes of nickel (II) are given in Table 2. The proton signals of the end groups in the $NiL^{5}\cdot NH_3$ complex are shifted to strong fields compared to the proton signals in the $NiL^{2}\cdot NH_3$ complex, which is due to the introduction of electron donor groups in the benzene nucleus. Multiple signals centered at δ 7, 22 and 7,64 ppm with a total intensity of five protons due to the protons of the phenyl ring of the hydrazide residue. The isolated nickel (II) complex compounds turned out to be diamagnetic in solutions of various solvents as well. The results of the study of ^{1}H NMR spectra and diamagnetism allow us to conclude that the synthesized nickel (II) complex compounds of structure III have a square-planar structure. The proton signals of the end groups in the $NiL^{5}\cdot NH_3$ complex are shifted to strong fields compared to the proton signals in the $NiL^{2}\cdot NH_3$ complex, which is due to the introduction of electron donor groups in the benzene nucleus. Multiple signals centered at δ 7, 22 and 7, 64 ppm with a total intensity of five protons due to the protons of the phenyl ring of the hydrazide residue. The isolated nickel (II) complex compounds turned out to be diamagnetic in solutions of various solvents as well. The results of the study of ^{1}H NMR spectra and diamagnetism allow us to conclude that the synthesized nickel (II) complex compounds of structure **III** have a

square-planar structure. As an example, consider the ^1H NMR spectrum of the complex compound $NiL^2 \cdot NH_3$. The ^1H NMR spectrum of the $NiL^2 \cdot NH_3$ complex compound in a DMSO-d_6+CCl_4 solution shows multiple signals centered at δ 7,31; 8,064 and 8,068 ppm due to the protons of the aromatic nucleus. The type of signals is somewhat complicated due to their overlap. The signal from the protons of the coordinated ammonia molecule was recorded at δ 10,2 ppm. and has a slightly lower integral intensity. In our opinion, this is explained by the partial replacement of the ammonia molecule by the donor solvent molecule. The ^1H NMR spectrum of $NiL^4 \cdot NH_3$ differs slightly from that of $NiL^2 \cdot NH_3$. The signal from the proton of the vinyl part resonates at δ 5,52. The signals from protons of aromatic substituents are more complex due to the presence of bromine in the benzene core of the molecule and appear at δ 7,87; 8,41; 8,75; 8,85 ppm A weak signal from the protons of the coordinated ammonia molecule was detected at δ 10 ppm. The slightly up field shift of the signal from the vinyl proton should be explained by the formation of d-π-type dative bonds between the d-electrons of nickel(II) and the π-orbital of the conjugated system of five- and six-membered metallocycles.

Table 3.

Parameters of the ^1H NMR spectrum of nickel(II) complexes in solution DMSO-d_6+CCl_4 (δ, ppm)

Compound	**-CH=**	**CH_3-C=N**	**C_6H_5**	**Fc**
$NiL^2 \cdot NH_3$	5,18	2,27	7,31; 8,064; 8,068	4,04; 4,45; 4,87
$NiL^3 \cdot NH_3$	5,48	2,51	7,12; 7,32; 7,64	4,12; 4,41; 4,69
$NiL^4 \cdot NH_3$	5,52	1,90	7,87; 8,41; 8,75; 8,85	4,20; 4,41; 4,57

Conclusion: Thus, because of the ^1H and ^{13}C NMR spectroscopic studies, it was found that the ligands predominantly exist in the hydrazone form. Upon complex formation, the doubly deprotonated ligand residue is tridentately coordinated in a square planar form to develop five- and six-membered metallocycles. The effect of the nature of substituents on the aromatic ring of the benzhydrazide fragment on the electronic structure of the complexes was established by ^1H and ^{13}C NMR spectroscopy for nickel(II) and zinc(II) complexes.

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UDC: 547.297+547.572

SYNTHESIS OF THE 1, 2- PHENYLEN DIKARBOXYMETHYLENTARTRATE

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Annotatsiya: Maqolada pirokatexinni xloratsetillash va dixloratsetilpirokatexinning natriy tortrat bilan dimetilformamid va dimetilsulfoksid ishtirokida reaksiyalari keltiriladi. Dimetilformamid erituvchida sifat ishlatilganda 1,2-fenilen dikarboksimetilentartrat yukori unum bilan oling. Olingan moddalarning tuzilishlari IK- i UB- spektroskopiya usullari bilan o'rganilgan.

Kalit sozlar: pirokatexin, xloratsetilxlorid, xloratsetillash, natriy tortrat, nukleofil almashinish, dimetilformamid, spektroskopiya.

Аннотация: В статье представлены результаты изучения реакций хлорацетилирования пирокатехина и натриевой соли винной кислоты с дихлорацетилпирокатехином в присутствии диметилформамида и диметилсулфоксида. Высокие выходы достигнуты в реакции 1,2- фенилен дикарбоксиметилентартрата в присутствии диметилформамида в качестве растворителя. Строение полученных веществ установлено методами ИК- и УФ-спектроскопии.

Ключевые слова: пирокатехин, хлорацетилхлорид, хлорацетилирование, натрий тартрат, нуклеофильное замещение, диметилформамид, спектроскопия.

Abstract: The article presents the results of the study of the reaction of the sodium salt of tartaric acid dichloracetyl pyrocatechole in presence of dimethylformamide and dimethylsulfokside. The experiments attained the best exposures in the presence of dimethylformamide. The structure of the obtained materials are installed by means of IR- and UF- spectroscopy.

Keywords: pyrocatechol, chloroacetylchloride, chloroacetylation, sodium tartrate, nucleophilic substitution, dimethylformamide, spectroscopy.

Introduction. It is clearly known that compounds with antibacterial and analgesic properties synthesized on the basis of phenols and their esters, carbonic acid derivatives in pharmaceuticals, compounds with active groups such as halogen, hydroxyl, methylamine as fungicides in agriculture, aromatic amino compounds in paints and petrochemicals have been widely using. The reactions of chloroacetylation show high efficiency in the inclusion of active groups such as amino, alkyl, carbonyl in aromatic compounds [1]. In this work, we studied the chloracetylation reactions of pyrocatechole with chloracetyl chloride and the determination of the effects of temperature, duration of reaction, the ratio and nature of moles of solvents, catalysts and primary substances on the course of chemical reactions and the conduct of nucleophilic substitution reactions of oxyacids of dichloroacetyl pyrocatechole with sodium salts, the structure of substances synthesized using modern physical and chemical research methods.

Analysis and results. Thin-layer chromatography of the reaction products was carried out on Silufol - 254 plates (chloroform-methanol 20: 1 system, UV – plate). For the purpose of studying the structure of the synthesized substances, they were obtained on the SF-26 spectrophotometer UV-spectrum, UR-20 and Specord IR-71 spectrometer on the device with a cuvette thickness of 10 mm in the form of KBr tablets in the area of 400-4000 cm^{-1} [2].

Synthesis of chloroacetyl chloride (1). A mixture of 189.8 g (2 mol) of hydrochloric acid and 167 ml of anhydrous chloroform is poured into 154 g (1 mol) of freshly distilled phosphorous oxychloride and heated at 104ºC for 8-9 hours. Then the reaction mixture is cooled up to 20ºC. The formed phosphoric acid is isolated from the chloroform solution. Boling point of the product (**1**) is 106°C.

Chloroacetylation of pyrocatechole (2). In a tube with an adapted tube for the output of hydrogen chloride into the reverse refrigerator, the tube was placed in a round tube 11 g (0,1 mol) of pyrocatechole dissolved in 50 ml of chloroform, 22.6 g (0,2 mol) chloracetyl chloride was placed on it and boiled for 16 hours. After stopping the release of hydrogen chloride, the mixture was washed in alkaline water and extracted in chloroform, dried at Na_2SO_4. Chloroform was expelled under normal conditions, the residue crystallized when cooled to room temperature, and it was again crystallized in ethanol. The productivity of this product was 60%.

Obtaining ester of tartaric acid from the reaction of dichloroacetyl pyrocatechole and sodium tartrate (3). 0.02 mol of sodium tartrate and 0.01 mol of dichloroacetyl pyrocatechole were added to a 100 ml volumetric flask with a flat bottom and mixed with a magnetic stirrer by placing 10 ml of dimethylformamide on it at 70ºC for 5 hours. During this process, the sodium tartrate was completely dissolved. When the reaction was complete, the reaction mixture was washed in chloroform and filtered. The resulting chloroform filtrate was dried with Na_2SO_4, then in a flask with dephlegmator the chloroform was first distilled at 61ºC, the residue crystallized when cooled to room temperature, and it was cleaned repeatedly in ethanol by crystallizing.

Results and discussions. When the chloroacetylation reaction of hydroquinone is carried out in a chloroform

solution, only the O-acidification reaction takes place, and dichloroacetyl pyrocatechole is formed with 90% yield. At the moment of the reaction of

pyrocatechole and chloroacetyl chloride, the electron density in the chloroacetyl chloride molecule is sorbed towards the electron oxygen, and oxygen acquires a partial negative charge [3]. As is known, the reactions of alkylation and acylation of aromatic compounds with halide alkyls or acyl halides with the participation of aprotic catalysts are reactions that occur during ionization, and these reactions proceed well in polar solvents. It is known that alkylation and acylation of aromatic compounds in the presence of aproton catalysts with halide alkyls or acyl halides are reactions that take place in an ionic mechanism, and these reactions proceed well in polar solvents [4]. Since the above reaction proceeded in a non-polar solvent (benzene) and without the participation of a catalyst, an acyl cation (in ion pairs) does not form. The refore, this reaction takes the form of nucleophilic substitution in the carbonyl group of the chloroacetyl chloride molecule and an ether product is formed. The oxygen atom in the phenol molecule acts as a nucleophilic reagent [5]. The phenyl esters of α-chlorine substituted acetic acid readily undergo nucleophilic substitution reactions. Various compounds can be synthesized using the phenyl esters of α- chlorine substituted acetic acid [6]. The reactions of nucleophilic substitution between glycol, wine, sodium salts of citric acids with dichloroacetyl hydroquinone were carried out. Since the carboxylate ion is a very weak nucleophilic substance, its reaction with halogenoalkanes does not occur in solvents with proton and an ester is not formed. If the reaction of an acid salt (RCOOMe) with an alkyl halide is carried out in a GMFTA solution, the ester is formed with high yield [7]. The relative “activity” of nucleophiles (the ability to react) changes in parallel with their electromagnetism as follows: $CF_3COO^- >> CH_3COO^-$ But in the series of halogen ions the sequence is different; it directly depends on their electromagnetism. Alkaline earth metal salts containing solid anions are poorly soluble in KF, LiF, KCN, NaCN, RCOONa, etc., dipole aprotic solvents DMF, dimethylacetamide (DMATS), DMSO, HMPTA, acetonitrile and do not react. In order to overcome this difficulty, tetraalkyl ammonium salts are used. The weak solvation of anions and the effective solubility of the transition state of the ion-dipole interaction in dipole aprotic solvents lead to a sharp increase in the rate of S_N2 reactions. In these experiments, the highest yields of ester enrichment were 78% respectively. As is known, bipolar aprotic solvents (DMSO, DMF, THF, acetone, dioxane) facilitate the reaction of bimolecular nucleophilic substitution with alkyl halides until the cation is soluble in the carbonic acid salt. The activity of anions in dipole aprotic solvents depends on the size of the ion and the magnitude of the charge, that is, on the hardness of the anion. First of all, the nucleophilicity of halide ions in S_N2 reactions decreases in the following order in methanol, ethanol and other proton solvents: However, in DMF, DMSO and other dipole aprotic solvents, a completely different sequence is observed: From this we can conclude that the nucleophilicity of anions in dipole aprotic solvents corresponds to their true nucleophilicity than in proton solvents. According to experimental data, the ability of undiluted naked anions to react in the gas phase is at least ten times higher than that of dipole aprotic solvents. Under the influence of solvents, it is possible to change the nucleophilic properties of the reagents, the reaction rate and even the reaction rate. Dimethylformamide does not dissolve halogen atoms, as a result of which the energy of a small anion of chlorine in the volume is greater than the energy of large anions of bromine and iodine. The refore, the chlorine anion

becomes stronger nucleophilic than the bromine and iodine anions. The absolute scale of the nucleophilic texture array cannot be compiled, since the nucleophilic property of one particle in different reactions is not the same. However, comparing the relative reaction rate of a standard substrate with various nucleophiles, a certain range of nucleophilic properties of the reagents can be obtained. Nucleophilic properties can be empirically determined. For this reason, the relative reaction rate of the standard substrate with various nucleophilic reagents is taken as the basis [8].

The course of the reaction was controlled by the method of TLC (thin layer chromatography), and the product of the reaction to the deposition was filtered. System: Chloroform-methanol 20:1.

The structure of the synthesized substances was confirmed using IR - and UV - spectra. Valence oscillations of the -CO- group in the IR spectra of dichloroacetyl hydroquinone at 1768-1751 cm^{-1}, valence oscillations of the -C=C- bond in the aromatic ring at 1597-1505 cm^{-1}, deformation oscillations of the adjacent -CH- group (1,2 - substituted) at 832-812 cm^{-1}, valence vibration of the aromatic ring CH - group at 3434 cm^{-1}, - CH_2 - symmetrical and asymmetric valence vibrations of the group 3002 cm^{-1} and 2953 cm^{-1}, deformation vibrations of the group CH_2 – at 1406 cm^{-1} and valence vibrations of the C-Cl garden 737 cm^{-1} were manifested in areas. When analyzing the IR spectra of complex ethers synthesized on the basis of dichloroacetyl pyrocatechole, the following data were obtained. Valence oscillations of -COO - group in the range 1197-1097 cm^{-1}, valence oscillations of C=C - bond in the aromatic ring in the range 1663, 1512 cm^{-1}, side-standing deformation oscillations of CH-groups (1,2-substituted) in the range 804-851 cm^{-1}, valence oscillations of C-Cl Gardens in the range 420, 443 cm^{-1}, valence oscillations of-symmetrical and asymmetric valence vibrations in the CH_2-group occur in the range of 2837, 2856 cm^{-1} and 2908, 2960 cm^{-1}, deformation vibrations of the CH_2- group occur in the range of 1426, 1510 cm^{-1}. The absorption maximums of the obtained dichloroacetyl hydroquinone derivatives were observed in the UV-spectra with the range of 240-250 nm.

Conclusion. Preparative methods for the synthesis of new derivatives of oxy acids as a result of O-chloroacetylation reactions of pyrocatechol have been proposed.

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ASTRONOMICAL CONTENT AND NATURE OF GEOMETRIC FORMS

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Annotatsiya. Bu maqolada Hindistonda XVI asrda geometrik panjarani asronomik ko'rinish olishda, 18 ming olamni xaritasi ya'ni kosmogramma tasvirlanganligi aniqlanganligi va Samarkanddagi Ulug'bek madrasasi ilgari surilgan 18 ming yilgi dunyo xaritasi bilan yangilangan.

Kalit so'zlar: Falakkiyot, koinot,model, arxitektura, astronomik, go'ya, osmon, simvol, ezotrik, ekzotrik, naqsh, tarix, mantiq, geometrik, galaktika, kompozitsiya, simmetriya.

Аннотация. В этой статье объясняется, что астрономический анализ геометрической сетки в Индии в XVI веке выявил карту 18 000 вселенных, космограмму, и сравнил ее с 18 000 картами мира на крыше медресе Улугбека в Самарканде.

Ключевые слова: Астрономия, вселенная, модель, архитектура, астрономия, идея, небо, символ, эзотрика, экзотрика, узор, история, логика, геометрия, галактика, композиция, симметрия.

Abstract. This article explains that an astronomical analysis of a geometric grid in India in the 16th century revealed a map of 18,000 universes, a cosmogram, and compared it with 18,000 world maps on the roof of the Ulugbek Madrasa in Samarkand.

Key words: Astronomy, universe, model, architecture, astronomy, idea, sky, symbol, esotric, exotric, pattern, history, logic, geometry, galaxy, composition, symmetry.

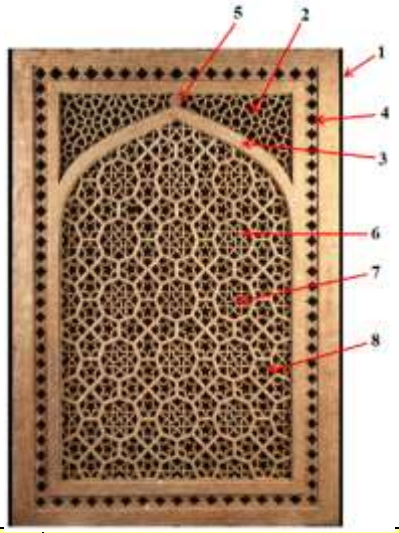
Introduction. Geometric shapes have been used in monumental decoration since ancient times, and each has its own unique symbolic expression.Most of the geometric shapes represented the symbol of the elements of the universe. Our ancestors symbolically expressed their deep philosophical thoughts and ideas through geometric shapes such as squares, triangles, rhombuses and circles[1, 114].

Literature review. Divine Breath spreads all over the world. Because we pronounce syllables and words as we exhale. The breath of compassion brings noble forms and forms of emotion A.Dj. Arberry describes this doctrine in the following four patterns. 1) The shape is expressed in a rectangular structure; 2) Expansion- The second rectangular corners are mounted on the center axes of the rectangle. The result was an octagon; 3) Narrowing - a rectangular cross with a triangular carving on the central axes of the rectangle; 4) Breath and Compassion (mercy) -expressed using a series of combinations with octagonal cross patterns [1, 120].

Along with the beauty of the geometric pattern carved from plaster on the walls of the Palace of the Termez, it had a philosophical meaning. Of course, these patterns are simple, but these images are esoteric, that is, they are secret symbols, which indicates that the potter is well versed in astronomy, and also knows the esoteric and

exotric symbols very well and has a high level of skill in depicting them through ornaments. The image shows the structure of the universe (cosmogram). An octagonal girder composition is drawn. The reason why the Girix pattern is derived from the octagonal pattern is that the octagonal star represents the octagonal model of the universe (the eight sides of the universe). The concept of the eight sides of the universe is clear only to a certain category of qualified people. The points on the horizon of these eight directions were considered to be the reference points of the sky relative to the ground, and thus the eight-directional symbol of the universe emerged [2].

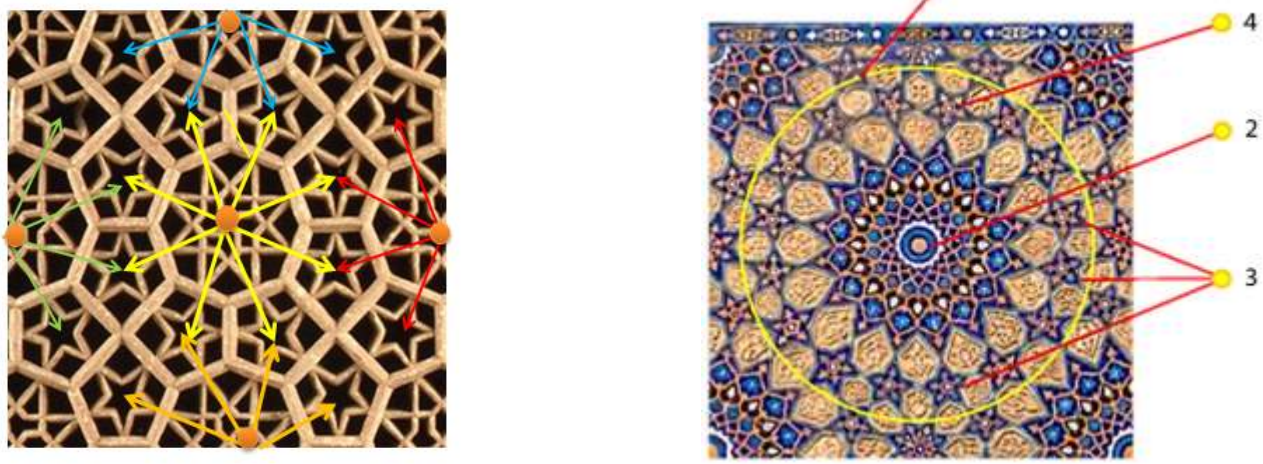
Analysis and results. Later, the concept of the eight sides of the universe and its definition became known in medieval astronomy as the “Indian people”. Abu Rayhan Beruni's Tafhim also mentions this, and he served as a compass for a long time in the Muslim East. Ali Qushchi, a scholar of the Ulugbek school, also wrote about the "Indian people" in his work "Risola dar ilmi hayyat". In general, there are many references to the eight model of the universe, and they are observed in archeological finds [5] and examples of applied art from the 5th century BC to the 7th century AD. It can be seen that astronomical ornaments decorated in eight, five, six and other forms are also represented in foreign countries. For example, you can see a sandstone fence. It was built in India in the 16th century during the reign of Akbar Shah (1556-1605). Made of red sandstone material. The grid is a two-story building with a specific meaning, denoting two worlds i.e. the world of existence and non-existence (1picture and 1table). The first layer consists of 5-8 sided shapes. The five-pointed form signifies a five-day world, i.e., that people live in a fanciful world. The octagonal shape represents two worlds. The wheel on the second layer represents the eternal movement of the two worlds. The five-pointed stars represent the constellations. The octagonal star below the three parts of the altar represents heaven. The altar is the gateway from one world to another.



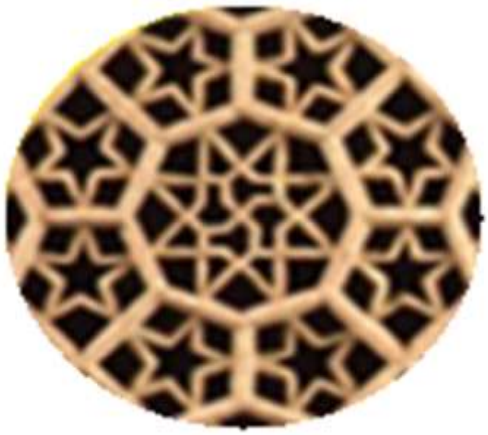
№	SYMBOLS	MEANING
1	Straight rectangle -	means that the universe was created on the basis of certain laws and norms.
2	Geometric pattern -	means that the universe is made up of strict laws and in a certain order.

3	Mehrob -	the two worlds i.e. the gate of the universe of existence and non-existence.
4	Three leaves in three parts of the altar -	is given in the symbol of the crown, and is given in the image of the two kings of the worlds, the creator of the universe.
5	Asterisk-shaped frame pattern -.	signifies that the universe will be repeated forever
6	Eight-pointed star -	is the harmonious creation of two worlds and a model of two worlds.
7	Charxpalak -	that the universe is made up of eternal motion.
8	Five-pointed star -	represents a constellation and a five-day world. Fan means the transience of the world.

The three parts of the altar depict a leafy flower, which is depicted in the crown symbol. This indicates that Allah is the King and Creator of the entire universe. The rhythmic repetition of the border patterns on the edge of the grille means that night and day alternate forever. The fact that a single star is depicted in a broken state on the grid signifies a lesser world. The fact that the raw material is obtained in gold color indicates this damage. That is, people understand these two worlds through enlightenment. The system of galaxies and their gravitational rotation in the composition of this grid show that the astronomical decorations at the Ulugbek Madrasa are in harmony with the idea of a grid in India. In both compositions, 18,000 world maps were found (pictures 2,3,). The picture is a comparative view of the image of the galaxy in the Grid and the photograph of the galaxy in the universe.



2- picture. The diagram on the left shows parts of the galaxy at Ulugbek Madrasa. 1 - galaxy, 2 - the nucleus (ring and hole) of the galaxy, 3 - stars, 4 - the axis of rotation of stars. Astronomical analysis of the pattern on the carved grid in the drawing on the right. Rotation of galaxies and their gravitational relationship with each other and their comparative analysis.



3- picture. An image of a galaxy in a grid and a comparative view of a photograph of a galaxy in the universe.

Conclusion. In the Middle Ages, geometric shapes have been used in monumental decoration since ancient times, and each has its own symbolic expression, most of which symbolize the elements of the universe, and our ancestors through geometric shapes such as squares, triangles, rhombuses, circles prosperity, the proliferation of livestock, and the profound astronomical philosophical thoughts and ideas they have symbolized. In the 16th century, an astronomical analysis of a geometric grid in India revealed a map of 18,000 worlds, a cosmogram, and compared it with a map of 18,000 worlds on the roof of the Ulugbek Madrasa in Samarkand, and found harmony between the compositions.

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