



ACTUAL PROBLEMS OF MODERN SCIENCE, EDUCATION AND TRAINING

KHOREZMSCIENCE.UZ





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UDC: 811/811.879

CORPUS LINGUISTICS: HISTORICAL AND LINGUISTIC ASPECTS

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Annotatsiya - Maqolada korpus tilshunosligining asosiy rivojlanish bosqichlari keltirilgan. Birinchidan, u uning rivojlanishining old shartlarini tavsiflaydi va korpus tilshunosligiga asos solgan tilshunoslik tarmoqlarini ko'rsatadi. Ushbu maqolada xorijiy va mahalliy binolarning birinchi yaratilish tarixi batafsil bayon qilingan, shuningdek korpus tilshunosligining mustaqil ilmiy fan maqomiga oid asosiy bahsli savollar yoritilgan. Maqolada korpus tilshunosligining zamonaviy holati va uning chet tilini o'qitishda ahamiyati haqida fikrlar yuritilgan.

Kalit so'zlar: korpus tilshunosligi, milliy korpus, Brauning korpusi, Britaniya milliy korpusi, korpus yordamida o'qitish.

Аннотация – В статье описаны основные этапы развития корпусной лингвистики. Во-первых, он описывает предпосылки для его развития и показывает отрасли лингвистики, которые легли в основу корпусной лингвистики. В статье подробно рассказывается об истории создания первых зарубежных и отечественных построек, а также рассматриваются основные дискуссионные вопросы о статусе самостоятельной научной науки корпусной лингвистики. В статье рассматривается современное состояние корпусной лингвистики и ее значение в обучении иностранным языкам.

Ключевые слова: корпусная лингвистика, национальный корпус, корпус Брауна, Британский национальный корпус, обучение с помощью корпуса.

Abstract – The article describes the main stages of development of corpus linguistics. First, it describes the preconditions for its development and shows the branches of linguistics that formed the basis of corpus linguistics. This article details the history of the first creation of foreign and domestic buildings, as well as the main controversial questions about the status of independent scientific science of corpus linguistics. The article discusses the current state of corpus linguistics and its importance in foreign language teaching.

Key words: corpus linguistics, national corpus, Brown's Corpus, British National Corpus, training with the help of corpus.

Introduction. The development of corpus linguistics, as well as the construction of corpuses, is one of the urgent problems of modern linguistics. At the moment, the use of corpora plays a leading role in most linguistic research. Although in the first half of the twentieth century it was possible to build the buildings only by hand. This took a lot of time, effort and expense. Therefore, the use of text corpora was minimal and only when a large number of people were interested in it. But thanks to the development of corpus linguistics, the use of corpuses has become possible everywhere. It has



become much easier to structure and synchronize material, and costs have dropped dramatically.

Literature review. The importance of the development of corpus linguistics is beyond doubt. It combines many of the positive properties of the humanities and technical sciences. But having emerged relatively recently, it did not have time to fully form, and its status as an independent science has not yet been established. Thus, many scholars consider corpus linguistics as a sub domain of the traditional one. They argue that it has only applied application, and there are no theoretical justifications. In their opinion, corpus linguistics is an improved method for collecting and processing material, a new information resource. On the other hand, if there is applied corpus linguistics, why can't there be theoretical, i.e. discipline with its own subject, method and theory. The lack of a theoretical basis at the moment does not affect the possibility of its development in the future.

Analysis. In the middle of the XIX century in the scientific environment, a rational approach dominated, based on "linguistic intuition, which distinguishes between correct and incorrect constructions"; in contrast to this approach, an empirical approach appears, which suggests considering language as "a resource that provides a set of opportunities for communication". The development of this approach was the beginning of the creation of corpus linguistics. Many of the technologies that are now used in the construction of enclosures were invented long before the advent of computers and electronic resources. Some of them were used as early as the 18th - 19th centuries, when linguistics began to be considered an independent and independent scientific discipline. Zakharov V.P. in the textbook "Corpus Linguistics" names the technologies that influenced the creation of corpora. He identifies three main areas of linguistic research, which became the basis of corpus linguistics, although he notes that there were much more of them. He singles out comparative-historical linguistics as the first such area. Scholars working in this field have always referred to a huge number of different texts [1]. The use of technologies for the reconstruction of proto-languages can be found in modern linguistics. The second area, which Zakharov V.P. gives preference to compiling grammars and dictionaries and teaching the language. Indeed, any grammatical rule needs to be illustrated. And in this case, examples from the text can be excellent help in this. Corpora as sources of empirical data play an important role in teaching a foreign language [2]. The last area that influenced the development of corpora is sociolinguistics. As early as the 19th century, scientists began to develop dialect maps and compile collections of dialect relations. At the same time, it was necessary to take into account various criteria when compiling textbooks on dialects. All these factors served as the beginning of corpus linguistics.

At the moment, corpus linguistics is successfully developing the technologies and methods that led to its inception. Also, do not forget about the technical side of the issue. There has been a sharp leap in the development of computer and information technology [3]. These possibilities began to be successfully applied in linguistics and linguistics. Thanks to the development and popularization of the world Internet, a huge number of users from different countries could use the data from the corpus. In addition, there was no longer the problem of completeness and expansion of the enclosures. Most of the research in the field of corpus linguistics has been carried out



on the material of English texts. There are two main reasons for this: firstly, there is an active development of computer technology in North America and Western Europe, and secondly, there is a favorable climate for the development of British linguistics in the 60-80s of XX century [4].

Discussion. The first linguistic corpus is considered to be the Brown Corpus. It was developed in 1963 by researchers at Brown University, W. Francis and G. Kuchera. The volume of the first corpus is 1 million tokens, i.e. it includes 500 fragments of 2000 words each from texts published in 1961 in the USA, of different genres [5]: literary texts by famous writers and poets, articles from newspapers and magazines, examples of written business speech and texts on religious topics. There are several reasons for the creation of the Brown Corpus. First of all, this is the provision of a systematic study of English texts belonging to various genres, second, the provision of sufficient material to compare these data [6]. Third, attracting the interest of many scientists to the emergence of a new scientific discipline. It was a breakthrough in applied linguistics that generated a lot of controversy and debate. As for the compilation of the corpus itself, it was built, on the one hand, on the basis of statistical data, and, on the other hand, on the experience and intuition of scientists. To achieve objectivity, it was necessary to use simple and transparent texts [7].

Later, in 1971-78, following the example of their American colleagues, European scholars began compiling a different corpus of texts. It was named The Lancaster-Oslo / Bergen Corpus of British English, LOB. This dictionary was compiled mainly by British and Norwegian scholars. They were guided by the same principles as the scientists at Brown University [8]. At the time of its creation, it consisted of 500 texts belonging to various genres, with a volume of 2000 tokens.

The most popular at the moment is the British National Corpus (BNC). It was created in 1991-1994, researchers from Oxford University and Lancaster University [9]. Its volume is 100 million tokens and it is much larger than its predecessors. In terms of composition, it is 90% written and 10% oral. The texts belong to the end of the 20th century and represent different genres [10]. It contains newspaper articles, popular science literature, examples of business correspondence, texts on religious topics, transcribed recordings of an informal speech, radio show, government speech, etc.

It is worth noting that it was the British Corpus who received the "national" status first. Plungyan V.A. writes that "for the British, the word "national" meant primarily" characterizing the British national version of the English language [11]." After all, there are also American and Australian versions of the English language. But after a while this corpus became the standard of all corpuses and the meaning of the word "national" changed somewhat [12]. The national corpus was called the corpus, which is the largest and most representative and which characterizes the language of a given country as a whole. Plungyan V.A. notes that the national corpus should not only be large in volume, but also contain texts of various genres in all their diversity in a given historical period, and at the same time contain them in the correct proportion.

Conclusion. Thus, the linguistic corpus is a means for solving not only scientific, but also educational and methodological problems. The benefits of its application in various fields are beyond doubt, although the theoretical basis has not yet been fully



worked out. That is why scientists still cannot answer the question: "What is corpus linguistics: a new scientific discipline or just an information resource?" We hope that soon the answer to this question will be found and corpus linguistics will become an independent scientific discipline.

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UDC: 81'44:130.122 [=512.133/=111]

CRITERIA FOR THE CREATION OF THE NATIONAL CORPUS OF THE UZBEK LANGUAGE

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Annotatsiya – maqolada o'zbek tili milliy korpusi va uning yaratilish me'zonlari haqida umumiy ma'lumotlar keltirilgan. Shu bilan birga o'zbek tili milliy korpusining taraqqiyot bosqichlari haqida ham ma'lumotlar keltirilgan. Bundan tashqari korpus lingvistikasining tilshunoslikdagi o'rni haqida ham fikr yuritilgan.

Kalit so'zlar: o'zbek tili milliy korpusi, korpus lingvistikasi, lingvistika, sintaksis, semantika, ijtimoiy lingvistika, metodologiya.

Аннотация - В статье представлены общие сведения о национальном корпусе узбекского языка и критериях его создания. Также есть информация об этапах развития узбекского языкового национального корпуса. Обсуждается также роль корпусной лингвистики в лингвистике.

Ключевые слова: национальный корпус узбекского языка, корпусная лингвистика, лингвистика, синтаксис, семантика, социолингвистика, методология.

Abstract - The article provides general information about the national corpus of the Uzbek language and the criteria for its creation. There is also information about the stages of development of the Uzbek language national corpus. The role of corpus linguistics in linguistics is also discussed.

Key words: national corpus of Uzbek language, corpus linguistics, linguistics, syntax, semantics, sociolinguistics, methodology.

Introduction. Modern Uzbek, like other languages, has undergone a number of changes in its historical development. In order to study the specific features of each stage of development, the stages of language development were separated and studied, in which the specific features of the language of the period were illustrated with the example of the work of a particular writer. Although there are a number of linguistic studies that fully cover the creative heritage of the artists of each period, they have not taken the form of a specially structured database. In the age of information technology, it is unfortunate that such a holistic system does not exist for Uzbek (Turkish) written sources. Today, corpus linguistics is understood in linguistics as a new approach to the use of language in real life using computers and electronic corpora. While sections of linguistics such as syntax, semantics, and sociolinguistics are intended to describe or evaluate the structure or use of language, is a broad concept, methodology that can be applied to many aspects of corpus linguistics research. National corpus of major languages of the world has been created and is being created. Many of them are described in detail.

Literature review. Creating a national corpus of the Uzbek language is one of the urgent tasks of our linguistics. The importance of creating a national corpus of the



Uzbek language is that the researcher will have a huge amount of information to obtain. It provides fast, accurate and complete information on all linguistic features of language units, the development of the language, changes in it - updates and obsolescence, activation and inactivation, easily create large-scale academic dictionaries of various types, automate texts processing. In the history of our linguistics, there are many special studies devoted to the study of the nature of language by a particular author [1]. There are a number of works on the linguistic features of monuments based on the Runic and Uyghur scripts. In this research, some morphological, syntactic and phonetic features of the ancient Turkic language were analyzed. V.V.Radlov, S.E.Malov, A.M.Sherbak, G.Abdurahmonov, A.Rustamov studied the language of monuments in runic writing. Written monuments of XI-XIV centuries linguistic features in the works of A.K.Borovkov, "Devonu lug'otit turk" in the works of A.Fitrat, Yusuf khos Hojib's work "Kutadgu bilig" language features V.V.Radlov, S.E.Malov, V.V.Bartold, E.E.Bertels, Ahmad Yugnaki's work "Hibatul-haqayiq" was studied separately by S.E.Malov, E.E.Bertels, K.Mahmudov. The epic "Story of Yusuf" by M. Brockelman, which is dominated by the features of the Oghuz dialect, the legend of "O'g'uznoma", one of the ancient monuments of the Oghuz and Qarluq-Uyghur dialects G.N.Potapin, A.M.Sherbak, XIV The linguistic feature of the work "Love Letter", a monument of the literary language of the twentieth century, was also studied by A.M.Sherbak [2]. In the style of official documents compiled in the XI-XIV centuries, the peculiarities of the language of that period were reflected. Legal documents published by S.E. Malov and labeled in the X-XIII centuries, Bukhara documents of the XIV century published by O.D. Chekhovich and economic records of the XIII-XIV centuries published by E.R. Tenishev will help.

Analysis and Results: The features of the language of the XIV-XIX centuries, known as the old Uzbek literary language, are studied on the example of the works of Atoi, Sakkoki, Lutfi, Navoi. In particular, the language of Alisher Navoi's works is of special importance, and the research of A.K. Borovkov proves that it played an important role in the development of the old Uzbek literary language. His works have been studied on the example of language features. In these studies, the lexicon of the author's language is described in detail. Such research provides a favorable environment for observing the process of language development and change: the narrowing and expansion of meaning, the movement of historicism, archaism, and neologisms. Although such a feature is studied for each author and the language of the period, they are available in separate monographs [3]. If these studies are reflected in the national corpus on the basis of a holistic system, it will be possible to vividly visualize the process of historical development of any lexeme on the example of different author languages. The next task facing our linguistics is to create a corpus based on the integration of these studies. The implementation of this task involves two stages: 1. Formation of the creative heritage of writers who studied the features of language during the historical development of our language and the results of research as a corpus; 2. To create a corpus of works of writers and poets whose language features have not been studied yet. The first task is to ensure that the studied national and cultural heritage is stored in electronic form in an integrated system (in the form of a corpus) and then used for various educational and research purposes [4].



The second task is to provide an electronic database for different philological studies of the works of writers and poets, whose language has not been studied, as well as to preserve, use and fully pass on our national and cultural heritage and language to the next generation. [5] Preserving and developing the lexicon of great national writers, who have made a significant contribution to the development of literary language, serves as a factor in preserving and developing the literary language. In this regard, the works (structured corps) based on the literary heritage of the world-famous writers Shakespeare, Dante, Goethe, Pushkin, who are the founders of the national and literary language of their nation, serve as an example [6]. This includes the works of writers Shandor Petefi, Henrik Ibsen, Adam Mickiewicz, Karel Chapek, who are recognized as the most optimal carriers of literary language. Although corpus linguistics has made great strides, the experience of creating an author's corpus has only been formed over the last 5 years, and much has been achieved in this regard [7]. The construction of such a corpus serves as a valuable function as a material for the study of the literary language of a certain period, in particular, its lexical structure, its methodological features.

As mentioned above, there are several benefits to creating an authoring corpus. Issues such as the author's corpus, its peculiarities, the principle of its creation are the subject of research in this section. Since the issue of composition, interface, and layout of the author's corpus is the main problem of building the corpus, it is expedient to pay attention to this aspect of the author's corpus available on the Internet. Material selection for the case: problem and solution. It is not difficult to create an author's corpus of languages with a national corpus. Because the text (author's work) is available in electronic form on the website or in the corpus.

Discussion. Due to the fact that these works are on the network under copyright, there is no obstacle to receive them as raw materials in the corpus. It is natural to have some problems in creating corpora in languages that do not have a national corpus. Although there is no national corpus of the Uzbek language, many works of classical and modern poets and writers are posted electronically on Ziyonet. On this basis, the creation of the author's corpus can be based on two sources: 1. A collection of published excellent works of each author. 2. Electronic files on the Internet [8]. If we use the first source as material by converting it to electronic form (scanning, converting the text to a format that AI can understand), we can use the second source relatively readily. In both cases, after obtaining the electronic form of the text, there is a need for its technical processing - tokenization, lemmatization, syntactic marking. Prior to technical processing, the text is prepared for the corpus, as it also contains a non-linguistic unit. The main feature of the body text is that it does not have a non-linguistic unit (table, picture, graph). Only then can you proceed to the marking stage. Marking is performed in automatic and semi-automatic modes. Particular attention is paid to the neologism used by the author, the lemmatization of words written in another alphabet. When the case is ready, naturally, the frequency dictionary of the author's works will be ready.

Because in the process of lemmatization the word form and the amount of lexeme (lemma) are determined. For example, the corpus of Chekhov's works contains 36,153 lemmas or lexemes. These lemmas accounted for 1,381,000 usage cases (120,000 words). Depending on the use of the word, the average length of a sentence



(how many words) is also determined. The frequency of lexeme use can also be calculated based on the year of writing, genre, sentence length. This allows the user to compare the frequency of the current literary language and the lexicon of the literary language of the author's period and draw conclusions. Such a comparative analysis can also be performed on the basis of the national corpus [9]. So, another purpose of creating such a corpus is to create a different dictionary of the author's works. At the same time, from the point of view of history, it is possible to study the historical and cultural development and change of the language over a long period. To create a national corpus of the Uzbek language, first of all, the necessary materials are collected. Websites created in the Uzbek language in the formation of the corpus, e-books and articles from libraries also serve as the main source. Corpus information is distributed on the basis of a license in accordance with the laws of the Republic of Uzbekistan. They clearly indicate the source of the material. The National Corpus of the Uzbek Language is an electronic information system of Uzbek texts [10]. The national corpus of the Uzbek language will be posted on the site (for example, <http://uzbekcorpora/uz/>). The corpus is intended for linguists, translators and interpreters, language learners, pupils and students, foreigners studying Uzbek, who are interested in and use issues related to the Uzbek language.

Conclusion. Based on the observation of the existing national corpus, the study of the structure and composition of the corpus, we conclude that the corpus interface, search engine and text database are its main components. The first page of the website www.ruscorpora.ru, where the National Russian Language Corpus is located, contains basic information about the corpus and its creators, and in the menu on the right you can go to any page. This case menu consists of four parts. The homepage consists of a search resource of the site, additional information about the text attached to it, the principles of commenting on corpus units, the last block of corpus developers, the program used a complete database of copyright of texts. Of course, the structure and composition of the corpus can vary according to the characteristics of the language, social needs and other aspects. There is no single and constant standard for buildings. For example, the Uzbek language corpus to be created may be unique depending on the requirements of our society. The national word in the corpus means not only the language, but also the structure and composition of the corpus.

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UDK: 81.373

SYNTACTIC CRITERIA AND SYNTACTICAL SIMILARITY AND PECULIARITIES IN THE STUDY OF DOWNLOADS IN GERMAN AND UZBEK LANGUAGES

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Annotatsiya. Ushbu maqolada nemis va o'zbek tillarida yuklamalar tadqiqida sintaktik mezon va sintaktik jihatdan o'xshashlik va o'ziga xosliklari haqida so'z yuritilgan.

Kalit so'zlar: sintaktik mezon, distant, kontakt, polifunksionallik, tema, rema, grammatik formant.

Аннотация. В этой статье обсуждаются синтаксические критерии и синтаксические сходства и различия при изучении загрузок на немецком и узбекском языках.

Ключевые слова: синтаксический принцип мезон, дистант, контакт, полифункциональность, тема, рема, грамматический формант.

Annotation. This article discusses the syntactic criteria and syntactic similarities and differences in the study of downloads in german and uzbek.

Key words: syntactic principle, distant, contact, polyfunctionality, theme, rhema, grammatical formant.

Introduction. One of the important issues of world linguistics is the study of the practical use of the language, its effectiveness. In this regard, comparative studies of small language units, to determine the expression of linguistic and national-cultural features in non-sister languages is an important task facing linguists around the world.

The category of downloads in German and other languages has been extensively studied on the basis of syntactic criteria that are formally enumerated in order to clarify their content.

Literature review. In the scientific literature devoted to the study of the syntax of downloads [1,2,4,6, 8] there are cases when they are considered with suspicion that



they are words. In particular, according to V.V.Vinogradov, the semantic relations of downloads correspond to their grammatical functions. The semantic scope of downloads is so wide that, as a result, lexical-grammatical meanings are in constant motion and are subject to syntactic usage [1;14]. It follows that the semantic confusion inherent in downloads provides the basis for their syntactic study.

Like a number of linguists, A.T.Krivonosov argues that a word belongs to two levels of language: nomination and syntax. [1; 14]. Analyzing the invariant words of the composition of the scientist, it can be noted that he used the term *word* not in terms of vocabulary but in terms of its activation in speech. But, for example, the fact that the preposition *denn* refers to several groups of words suggests that it is a lexeme. Because of this, we use the terms word and *lexeme* in our dissertation work.

According to Y.P.Nechay, the above problems led to the emergence of the term *grammatical formats* in relation to downloads [2; 19]. N.A.Toropova, on the other hand, tries to separate modal loads from logical loads, forms, intensifiers, modal words according to their structural features, emphasizing that modal loads are connected to the verb as an analytical-grammatical formant and give a new connotative meaning to the sentence [8; 7]. It follows that the semantic meaning of the prepositions becomes clear only in the context of the sentence.

If we study the first scientific considerations put forward by scientists, Y.Maybauer considers loads as an integral part of the section in which the syntactic function of the verb category is listed, and points out that their place depends on the verb [3; 3]. Germanist A.T. Krivonosov suggests that prepositions take place after the inflected verb [1; 35]. Hence, the lexical-grammatical features of prepositions depend on their place in the sentence and their dependence on the verb.

N.A.Toropova illustrates the predicative nature of downloads with the following example: Sie sagte es so, dass der Meister es *auch* hören konnte. In this example, the preposition *auch* is substantively linked to the verb *hören*. If we drop the *auch*, we lose the meaning that there are other than the master in this room [8; 21]. It is clear from this that prepositions are a verb-related language element based on predicative theory.

Z.Isakov's opinion on this issue is even more interesting. He explains this phenomenon as follows: downloads in Uzbek language affect the expressiveness of the sentence and do not change the content plan. This is because downloads represent a nonpredicative modality in sentence structure [7; 103].

The disobedience to the unanimous interpretation of the downloads, the instability features, lead to the search for answers to the question *Are they related to the communicative types of speech?* Many times. Germanist Min Je Kwon discusses this question in detail and explains that modal prepositions in German are related to the category of inclination of the sentence, as well as the function of the inclination indicator involved in determining the type of inclination, where the term "indicator" is used in the sense of threefold:

- 1) predicate argument;
- 2) form (shape) type;
- 3) correlation (i.e. function indicator) [3; 227].

According to the scientist, who understood the semantic and pragmatic level as the exact criterion, modal loads depend not only on the inclination of the speech, but

also can convert (replace) the inclination of the speech [3; 227]. We think that Min Je Kwon's description of the optional feature of modal loads as a syntactic feature does not justify itself. Since the main field of application of loads that do not affect the sentence proposition is the illusion, which is distinguished by the meaning of any illusion, the optional loading is related to the content, not to the sentence composition.

According to the German scientist M. Turmayer, the use of modal loads depends on the inclination of speech, and they are not able to be used continuously in any type of speech. For example, the preposition *aber* is common in prepositions and command sentences [9; 16]. According to the scientist, modal loads come neither in the front field nor in the outer field, they belong to the middle field according to their position [9; 29]. In our view, the existence of a frame construction law in German grammar is the basis for the preservation of rigid laws in the sentence structure.

H. Altman, a researcher of German language degree loads, testified that the cases of enklisis and proclisis present in other languages are not specific to German [5; 22]. Although this language phenomenon does not occur in degree loads, it may occur in rare cases in modal loads.

In this regard, Min Je Kwon emphasizes the occurrence of the phenomenon of enclave by providing the following example:

- 1) Was *ist* denn los?
- 2) Was *isn* los?
- 3) Wasn hier los -ne Sitzung? [3; 18]

It turns out that the phenomenon of enkliza, which is not peculiar to the German language, is a rare (unique) phenomenon among this group of words, which is peculiar only to the loading of *denn*.

Z. Isakov, based on the materials of the Uzbek language, explains the phenomenon of enclave as follows: "Prepositions are strongly connected to a certain word (noun unit), in the case of enclises they can also enter the phonetic structure of the word" (*boriboq*) "[7; 101].

The definition of downloads in Uzbek is based on syntactic criteria. According to it, auxiliary words that belong to a particular word, construction, or the whole sentence, and which express additional meanings of the word in connection with individual words, are called prepositions. The load can be combined with almost any word group, but it does not come as an independent part of speech [7; 124].

Thus, downloads do not perform a syntactic function in a sentence. Therefore, when talking about their syntactic features, it is emphasized that downloads do not pass this or that function in the context of speech. [See table 1].

Table 1. Syntactic properties of downloads

<i>Syntactic criteria</i>	<i>Features of downloads</i>
<i>according to the syntactic function of the sentence</i>	<i>inability to be a part of speech</i>
<i>according to the place in the sentence</i>	<i>that modal loads do not take precedence in speech</i>



<i>according to the nominative function of the sentence</i>	<i>lack of answer to the question</i>
<i>according to the obligation in the sentence</i>	<i>optional</i>

It should be noted that the syntactic features of prepositions include several features, such as the inability to answer the question as a component of the verb, the absence of a place in the beginning of the sentence, the fact that the sentence is optional according to the permanent components of the sentence.

- **Research methodology.** In order to identify similarities and differences in the syntactic aspects of downloads in German and Uzbek, we drew a comparative analysis of the role of downloads in these languages in the text. Examining the prepositions of the German and Uzbek languages according to their place in the sentence, we found that the stability inherent in the verb order encountered in the German language is also partially inherent in the Uzbek language. After all, in the Uzbek language the verb is stable from the end of the sentence. Therefore, the positions of the downloads in the languages being compared vary.

- **Analysis and results.** Downloads in German, unlike Uzbek, can take place in inter- and post-positions. In Yanikim, darak and interrogative sentences, all German prepositions are used in the interposition. This is because sentences in German are structured on the basis of a frame structure - each part of speech has its own fixed place. We can see this situation, especially in the example of the verb, where the prepositions are placed around the side of the verb, and this case is called the use of prepositions in German in interposition.

In the postposition, however, the prepositions are mainly used in command sentences and come at the end of the sentence. Such downloads include downloads such as doch, denn, mal, schon.

In Uzbek, downloads are often used in addition to pre- and post-positions.

In both the languages being compared, the downloads can be omitted, and the reason why the logical meaning of the text is not damaged is that they have a common denominator.

The reason why loads are more common in interposition in German is that in this language the owner and the cut of the gan are positionally close, in most cases the possessive is rightly in the first place, and the cut is steadily second, if it consists of two complex compound cuts.

It is known that in Uzbek linguistics the cut is approached as an absolute ruler, and the owner as a relative ruler. In Western linguistics, too, the center of comprehension of a sentence is the cut, and the expression of predicative is recognized through this passage. That is, the center of the sentence is a vertex consisting of a cut.

Although prepositions in both languages cannot be part of speech, they represent the semantic-syntactic relationships between the part of speech and the sentences with additional modal or modal meanings.



The modal meanings of the prepositions in German are that the speaker expresses his attitude, expresses his feelings and reveals intimacy, friendship, as well as the unfamiliarity and diversity of views of the interlocutors, fear of strangers, insecurity, avoidance of harsh touches, rudeness, tension. used for pragmatic purposes. While downloads are considered indicators of warmth and intimacy in communication, paradoxically, they can also indicate rudeness and tension. Hence, they serve to reveal not only positive but also negative meanings.

Downloads ensure the coherence, integrity, and syntactic integrity of the text by referring to additional commentary or information in addition to the expression of subjective meaning. It should be noted that this activity is carried out implicitly, not explicitly.

–Juda yaxshi-da? Meni tanidingizmi, o'zi? Men Zamon O'rozman-ku, birinchi qo'shiqlar to'plamini chiqarishga yordam bergandingiz. [10; 14]

The downloads in this text came in both rema content and theme content. New sentences come as rema, i.e. rema comes upon rema and the prepositions replace the verbs to be used, and thus formally compact the text, freeing it from redundant words, overload. The sentences used in the downloads complement the meaning of the sentences that came before it, bringing in new information, and in this case syntactically linking the two sentences, giving it an expressive polish. The downloads are mostly in the postposition, at the end of the sentence.

Downloads have a special meaning in the Uzbek language, they are separated by commas. In German, on the other hand, punctuation is not used, it is not phonetically separated, and in most cases it is not emphasized.

It is worth noting that the downloads in Uzbek show brighter emotions than in German. The reason for this is the predominance of the idea that the human mind must act.

The Uzbek endings and *-ku* have a special character, they can be syntactically separated from each other and replaced. In German, however, this was not the case.

Having studied the peculiarities of the chain and parallel connection of German and Uzbek downloads in the text, we were convinced that downloads can add additional meanings in the parallel and chain connection of texts. From the examples considered in the German language, it became clear that the sentences in the text were connected by using synonymous loads in separate sentences.

In Uzbek, on the other hand, sentences are connected in parallel by repeating the same type of load in two and three sentences. Especially in Uzbek, parallel connection using the *-ku* load is relatively common. In both languages, chain linking was relatively rare compared to parallel linking. This is because downloads do not have as wide a capacity as independent word groups.

In comparable languages, the communicative functions of loads play an important role in the formation of syntactic functions. In the examples mentioned by the communicative center, it was observed that the loads were expressed in terms of rema.

It was observed that in German, the communicative center is the basis not only for the rema, but also for the content of the theme. At the same time, the downloads were used in conjunction with the verb cut, further enhancing the importance of the topic.



In German, as in Uzbek, prepositions play an important role in establishing syntactic connections in sentences. However, we have seen that statements in the rema function in the monofunctional state exhibit a polyfunctional state due to the loads. In German, prepositions occur in the range of sentences that make up the text, not only in the rhyme but also in the subject. This is because the text consists of several content components, not one.

The additional meanings expressed by the prepositions in the languages under study also serve as an important factor in restoring the semantic connections between sentences. They represent additional meanings that have different semantic subtleties in both languages.

As in German, downloads in Uzbek are used without interaction with different parts of speech, such as possessive, participle, determiner, complement, and case.

In the Uzbek language, prepositions used in conjunction with primary and secondary parts, such as possessive, participle, adverb, and case, do not serve as a separate part of speech, but parts of speech, in addition to cores, serve as a grammatical function in the form of membership.

As a result of the examples analyzed, it became clear that the aspect of similarity in both languages is that the downloads are mainly grammatically related to the cut. The fact that they have an affix form makes this form clearly visible in the Uzbek language.

In summary, suffixes are used in both languages, mainly in contact with the cut.

-Conclusion/Recommendations. Our observations show that one of the peculiarities of both German and Uzbek is that the downloads are included in the rhymes, because the downloads that form the communicative center are more common in these rhymes. After all, downloads have the property of expanding the internal structure of information. They perform a pragmatic task by revealing the speaker's intuition as a means of actualization.

The fact that loads in the analyzed languages serve to establish grammatical connections on a spiritual basis shows that they are an important element of the context. After all, their inclusion in the list of elements of the communicative center is characteristic not only of downloads in German, but also in Uzbek.

By analyzing the linguistic phenomenon, such as the theme and rema, the role of the sentence in the division into active parts, the position, the place in the sentence, the role of the text in ensuring the integrity of the text, the syntactic significance of the communicative center, it can be concluded that Uzbek, which is a member of the Germanic and Altaic Turkic languages, has not only commonalities but also syntactic differences. The fact that the two languages belong to different families creates exactly these differences.

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UDK: 811.512.121

METHODS OF PREVENTION OF DYSLEX AND DYSPRACY IN THE DEVELOPMENT OF WRITTEN SPEECH IN BILINGUAL EDUCATION

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Annotatsiya. Ushbu maqolada bilingval ta'limda yozma nutqni rivojlantirish konsepsiyasi, ona tili darslarida nutqni rivojlantirish shakllari va vositalari, nutqni rivojlantirishda noan'anaviy usullardan foydalanish, disleksiya va dispraksiyani oldini olish metodlari muhokama qilinadi.

Kalit so'zlar: billing treningi, yozma nutq, disleksiya, dispraksiya, nutqni rivojlantirish, erkin fikrlash, so'z boyligi, so'z yozish.

Аннотация. В статье рассматриваются концепция развития письменной речи при двуязычном обучении, формы и средства развития речи на уроках родного языка, использование нетрадиционных методов развития речи, а также методы профилактики дислексии и диспраксии.

Ключевые слова: билинговое обучение, письменная речь, дислексия, диспареуния, развитие речи, свободное мышление, лексика, написание слов.

Annotation. This article discusses the concept of written speech development in bilingual education, forms and means of speech development in mother tongue lessons,



the use of non-traditional methods in speech development, and methods to prevent dyslexia and dyspraxia.

Key words: billing learning, written speech, dyslexia, dyspareunia, speech development, free thinking, vocabulary, word writing.

Introduction. Concern for the education and development of children is one of the ancient values of our people. In today's rapidly developing world, the role of kind teachers is invaluable in training a harmoniously developed generation with a worthy place and voice, a sense of respect for national and universal values, competitive personnel that fully meet world standards. Today's teacher is not an ordinary teacher, he must keep pace with the times. Today, the teacher is not only a ready-made information for the student, but also a specialist who guides the learner to creative thinking, predicting the acquired knowledge [3].

Unfortunately, there are many language difficulties in the world that can develop in adults and children. There are children who have great difficulty reading and writing. Such babies are usually considered lazy, but not everything is simple. Who knows, maybe the child has dyslexia? This is a special neurological condition, a learning disability that can affect a student's ability to recognize letters, numbers, and symbols. At the same time, sediment does not understand and does not understand the concept of reading, writing, mathematics, it has very low scientific performance. However, research by scientists shows that the IQ in such children is often higher than average. You can also try to diagnose this language difficulty. In this case, dyslexia can lead to some kind of failure in the child's brain, which allows access to a specific analyzer (for example, words or numbers).

The term was first used in 1887 by ophthalmologist R. Berlin. The doctor first encountered the problem when examining a comprehensively developed child. He had great difficulty in reading and writing, but at the same time the young man showed remarkable results in all other fields of knowledge. According to data in Berlin, the term was supposed to refer to problems when learning, reading, and writing in general. According to modern statistics, this language difficulty is not known, as it affects about 5-10% of the total population of the planet, and it is most often diagnosed at the age of 6-7 years. Due to its neurological nature, getting rid of this language difficulty is not very simple, it takes maximum effort from the child, takes the patience of the parents and, of course, a lot of time.

If dyslexia realizes that it is impossible to understand letters or numbers correctly, it is worthwhile to talk a little about what problems children with this language difficulty face.

1. Such children can see certain letters or numbers backwards, automatically turn them on and cannot read them.

2. Sometimes in children with this language difficulty, the text can "jump to the page", do not join the straight line.

3. There may also be problems with the difference between similar numbers and letters (e.g., "p" and "b", 10 and 01).

4. If a child can distinguish letters, it means that he cannot pronounce them in a row, that is, in one word.



5. A common problem is that he cannot remember the words he reads. You have to learn something new every time.

6. Often, these children cannot see the words, for which the letters are mixed.

7. However, children who solve this problem can change words with letters (read “all” instead of “weight”).

8. It is also not very easy for a child to understand and know all the letters, but there may be headache, nausea, dizziness when he tries to read the word.

Thus, the language difficulty can be classified according to several indicators.

1. Children with dysphonic dyslexia cannot speak. These are some types of secret codes that require you to reset your password at any time.

2. Children with disadetic dyslexia (also known as Gestalt Blind Dyslexia) have great difficulty remembering these words, but they may not see the difference between similar letters. Once you read a word on one page, it will not be read on the next page.

3. The third type of this language difficulty is the most complex and it is very difficult to help such babies: it is a combination of two lexicons.

Drug treatment does not cure this condition. Also, it is not possible to give anyone this option to fix the problem, there is simply no such drug. In this case, corrective action is required. Teachers, pediatric speech therapists and, of course, qualified professionals can help. Working with such children can also be in the classroom (the teacher should pay special attention to such a child, but it is very difficult) or the child should be sent to work with special teachers who can solve the problem [7].

Custom programs can include a variety of ways to work. It can even be an exercise to help deal with eye language difficulties. However, often dyslexia is considered on a case-by-case basis, and a specific program is selected and shaped for the child, which only helps him to overcome the problem. If the symptoms do not disappear immediately and the dyslexia does not return, treatment should be continued [8].

Methods. The development of written speech plays an important role in the prevention of this language difficulty. To do this, a qualified teacher must pay special attention to such a child. If the educator can understand the student, understand his inner feelings and aspirations, he will definitely find the right key to open the heart of the student. There are three main areas in which to develop written speech:

- 1) word search.
- 2) research on phrases and sentences.
- 3) research on related speech.

The three directions are parallel: the dictionary provides material for the speech; working on a word, phrase, and sentence prepares for a connected speech [2].

Written speech development is a much more complex process than oral speech. Because it requires students to build grammatically and semantically correct sentences, to use each word correctly in its place, to express the idea concisely, consistently, expressively, simply and fluently in terms of style, requires drawing conclusions based on the ideas expressed. The complex nature of this speech is again that it has to do with spelling, punctuation, and style. Writing a word correctly, using punctuation appropriately, and expressing an idea in accordance with the requirements of style require a great deal of responsibility from the reader. Therefore, this type of speech is much slower and more complex. Another characteristic of written speech is that it can



be checked, corrected, improved. In this respect it has more convenient possibilities than oral speech. The student works on the mistakes and shortcomings in the written speech, eliminates them, tries to avoid these mistakes and shortcomings in his subsequent work.

Another factor that hinders the development of students' speech in mother tongue classes is that students speak Tajik, Turkmen, Kyrgyz or another (dialect) language at school, at home, on the street or outside of class. Ethnographic data show that many Tajiks, Turkmens, Kyrgyz and Kazakhs live in the territory of our republic. Many of them spoke Tajik, Kyrgyz, etc. at home and studied in Uzbek at school. This, of course, limits the ability of students to express themselves freely, using the rich possibilities of language [4].

We know that students get bored of uniformity. Therefore, they should always use different methods and games to develop their speech. Here are some examples.

"Story" The teacher writes a few words on the letter board. For example: Delicate, like rain, clock and literature. Students independently create a story involving these words.

Discussion. "Cross-linking" Students will be given picture cards. After they get acquainted with the cards, the student writes an essay about the object in the picture. For example: "This is an apple tree. An apple grows in the garden and enters the fruit. The students love it very much." will have to say that they are interdependent. For example: "It's the sun. When the sun rises, the air is warm. The students love it. As the sun warms, apples and other fruits ripen." The third student then talks about the subject in himself and has to find the connection between the subject in the second child and the subject in himself. The game continues in this order.

Research results. "Searching for Commonality" Students sit in a circle. The facilitator throws the ball to one of the students and says two words that are not related to each other. For example: school and student, book and cupboard, sun and flower ... The student holding the ball returns the ball by saying the common sign between the word pairs.

"Journey" Students are asked to describe their journey from school or home to a specific location. Students observe the "object" independently for several days and describe it in writing. Through this game, which requires meticulousness, intelligence, observation, attention to the environment, it is possible to cultivate a sense of patriotism, love for nature, attention to the environment [1].

Teachers need to focus on developing connected speech in every lesson. It is recommended to use the following types of independent work to help develop connected speech:

1. To compose a sentence according to the requirements of a grammatical, spelling rule, to find examples. The teacher can cite such examples from literature textbooks, as well as from newspapers and magazines. When studying a work of art in a literature class, explain a word from a passage that refers to a particular rule of the native language, or memorize an example and, if necessary, copy the example into a notebook.

2. Create a coherent text using key words or phrases. It is a good idea to bring such words and phrases to class by writing them on a whiteboard or picture. For



example, the teacher of Surkhandarya N.Musayeva is diligent, diligent, excellent in order to strengthen the knowledge of students on the topic "Quality-word series"; polite, courteous, well-groomed, knowledgeable, with the theme of "Dildora - an excellent girl."

3. Use picture cards and slides. Asking them to write sentences, related texts, and short stories based on picture cards can have a positive effect on the growth of connected speech.

Pictures activate students' thinking, help them express ideas logically, and enrich students' vocabulary and make their speech more colorful. Another important aspect of working with a picture is that it actively influences the long-term memory of the rules of language. The student eagerly tries to describe the content of the picture. Selects a word to express an idea. Therefore, it is advisable to create grammar task cards with the help of pictures from various picture cards, magazines and other sources and use them, depending on the nature of the topic.

The content of the pictures selected for the card should not only attract the reader's attention, but, most importantly, correspond to the conditions of the task, provide practical assistance in revealing the nature of the topic, turning knowledge into skills.

Sample card

1). Find a title for the picture and create a story based on it. (Image of city or district center). Use words and phrases in your story, such as prosperous, beautiful building, crimson, blue, clear water.

2). Find the qualities in your story and write down their level.

At the bottom of the picture you can make a separate (envelope brush) and put the task card in the same pocket. This will make it easier to change the terms of reference depending on the purpose and nature of the topic.

Another type of picture card with a grammar task is to compose a story or sentence based on a given poem and a picture that matches the content of that poem. Both the poem and the picture chosen for the assignment should be appropriate for the age and level of the students. These cards not only develop students' connected speech, but also teach them to express the content of a poem in a prose way, to connect it with certain rules of the native language. As a result, students learn the material with great interest.

The grammar task on the picture card may vary depending on the nature of the topic. Picture cards can also be used in parallel classes. Picture cards with grammar tasks can be used to impart new knowledge, to repeat what has been said, and to explain certain facts.

4. Ask students to answer the questions or organize their questions and answers. For example, what do you know about deserts? What can you write about the sky, the clouds, the weather today?

The teacher should be able to give students a concise, clear, fluent, and oral explanation of their answers in accordance with the rules of literary language.

Some teachers do not make full use of their writing time. However, the student learns to correct mistakes, increases literacy, improves the ability to express ideas in writing. Therefore, depending on the nature of the lesson, it is important to use written work in each lesson to help develop relevant speech.



The teacher should carefully examine each creative work, point out mistakes and shortcomings, advise students, and prevent similar mistakes in subsequent work.

Another factor that can effectively influence the development of students' connected speech is the study of grammar in relation to statistics. In our opinion, this important principle should be successfully implemented both in the textbooks of the native language of the school and in the educational process [6].

The purity of speech means, first of all, its purity. It is known that in the speech of students there are a lot of repetitions, superfluous sentences, words that are not specific to the Uzbek literary language (from Russian and other sister languages). The main task of their native language classes is to clean their speech from such words, to express their thoughts in pure literary language, using its rich potential. We have listed above only the basic requirements for student speech. These requirements are inextricably linked, and a student can achieve good speech only by following all of these. Therefore, a teacher cannot focus on only one aspect of speech in a mother tongue lesson and forget the second requirement or leave one requirement in the lower grade and the other in the next grade. If these requirements are met regularly, speech development will be effective [5].

Conclusion. Using the above-mentioned games develops students' speech, increases vocabulary, and develops independent thinking skills. The above educational games not only increase the activity of students in the classroom, but also facilitate and strengthen the process of acquiring knowledge, serve to make every lesson aimed at the development of speech interesting. The idea of liberalization of our society is directly reflected in the educational process, provided on the basis of its reorganization and change of content, further humanization, socialization and democratization.

It is necessary to create an educational environment in which the student feels like a person, feels the attention to him. If the teacher creates an "environment of success" throughout the lesson and helps the student succeed in learning, and builds his confidence in his own strengths and abilities, an improved learning process will also come naturally. A source of educational communication will be created, which will be defined by transparency, interaction of participants, equality of arguments, a collaborative knowledge bank, mutual assessment and control. This means that the teacher must constantly work on himself, constantly improve his pedagogical skills, improve the educational process through the creative use of world and national pedagogical heritage and scientific achievements.

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UDK: 81.39

THE CORRELATION OF TYPES OF SPEECH ACTIVITY WITH SPEECH STYLE

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Annotatsiya. Ushbu maqolada adabiyot darslarida talabalarning nutq qobiliyatini rivojlantirishda nutq uslublarini farqlash g'oyalari muhokama qilinadi. Nutq faoliyatining turlari va ularni misollar yordamida qanday ajratish mumkinligi ham izohlangan. Gaplarning odatiy va xilma-xil tartibda tuzilishi uslub jihatidan batafsil yoritilgan.

Kalit so'zlar: nutq uslublari, adabiy va nutqiy kompetensiyalar, bibliografiya so'zlari, tilshunoslik, "Hellados" qissasi, leksik va grammatik materiallar.

Аннотация. В данной статье обсуждаются идеи дифференциации стилей речи в развитии речевых навыков учащихся на уроках литературы. Также проиллюстрированы типы речевой деятельности и способы их различения на примерах. Структура предложений в обычном и разнообразном порядке подробно описана в терминах стиля.

Ключевые слова: стили речи, литературно-речевые компетенции, библиографические слова, лингвистика, рассказ «Hellados», лексика и грамматический материал.

Annotation. This article discusses ideas for differentiating speech styles in the development of students' speaking skills in literature classes. The types of speech activities and how to differentiate them with the examples are also illustrated. The structure of the sentences in the usual and varied order is described in detail in the terms of style.

Key words: speech styles, literary and speech competencies, bibliography words, linguistics, the story of "Hellados", lexicon and grammar materials.

Introduction. While not ignoring the fact that the formation of literary-speech competencies is a very wide-ranging problem, we can say from observations that students confuse methodologically specific linguistic phenomena both in retelling and analyzing the content of a work of art. The reason is that the work of art has a linguistic and stylistic diversity, that is, in some places (in the language of the protagonists) the style of speech predominates, in some cases the author's words have specific forms of speech, in most cases the norms of Uzbek literary language are fully observed, in some cases expressions close to the scientific style occur. The style of conversation comes close to the artistic style. For example, "while figurative style is widely used in



literature style, it is also used in conversational style. But "the imagery here is used in a peculiarly stable, 'stereotyped' way." (9) Obviously, each style, including the speaking style, has its own unique aspects, and not distinguishing them in the development of students' speech based on the work remains a key factor in the mixing of styles.

The use of bibliography words in colloquial speech also leads to speech errors. For example, in the story of Hellados, the protagonist's expression "the speaker states" seems unusual when spoken in the language of a teenager. Of course, in such cases, the interpreter may be obsessed with the use of synonyms. In order to form students' speech correctly, it is necessary to equip them with the ability to compare and differentiate styles, to make a comparative approach to lexical and grammatical materials brought to the speech on the basis of a work of art. The study tutorial "Stylistics of the Uzbek language" states that "Speech styles are historically formed expressions of speech as a result of purposeful selection of a system of means of expression within a particular communication." [9]

The study guide distinguishes the following functional styles of literary language: 1) colloquial style 2) formal style; 3) scientific style; 4) journalistic style; 5) artistic style.

Methods. Methodological diversity in listening comprehension of speech does not cause too much difficulty: with the exception of words whose meaning is not understood, word forms, types of speech whose meaning is not understood, the listener is able to fully understand the content of the work. In the work on oral expression, the absence of bibliography words and word forms, syntactic devices are required. Although students tend to use uplifting language phenomena to narrate, they do not come close to an artistic style. Conversely, when expressing an opinion in writing, it is inappropriate to place words and word forms specific to colloquial speech, syntactic devices, such as filler and case, after the cut. Therefore, the teacher is required to work on the basis of theoretical information in the textbooks, acquainted with the work on methodology in Uzbek linguistics. In this case, it is necessary to organize the work on the formation of literary and speech components differently. [9]

Research results. In order to find information about the difference between the colloquial style and the scientific style, the features of the use of morphological and syntactic phenomena from the sources related to the methodology, we have selected the following points from the study tutorial "Stylistics of the Uzbek language":

"...the forms -gan + edi and - (i) b + edi, which form the past tense verb, can be used interchangeably with each other, with the property of showing the action performed long before the moment of speech. Of these, -gan + edi is more characteristic of written speech, - (i) b + edi is more characteristic of oral speech". [9]

In the study tutorial of linguist E. Kilichev "Practical stylistics of the Uzbek language (Grammar)":

"To reinforce the common meaning, to distinguish the affix of -ish can be added to the stem of the verb twice: as seen, as embraced. In the same sense, the -ish affix is added to both the leading and auxiliary verbs. This is typical of the style of speech. In the literary sense, it is enough to add the affix -ish only to auxiliary verbs". [7]



"In the style of speech, the -ish affix can express the meaning of respect by adapting to the form of respect expressed in the possessor of the sentence: mothers have come.[7]

"It is well known that the verbs of the passive degree form passive constructive sentences. Inactive constructive sentences are more typical of colloquial speech. This means that the use of verbs in the form of the active voice and the passive voice differs according to the style of speech".[7]

"The passive degree form also gives the verb the meanings of humility, politeness, sometimes avoidance, cutting. The content and tone of the speech play an important role in this".[7]

E.Kilichev, B.E.Kilichev's study tutorial "Fundamentals of speech culture and methodology" says: "The word order is relatively loose, a word that is important to the speaker is given at the beginning of the sentence. (Yesterday came back from the field he. Wrote to my brother a letter.) So, there is an inversion phenomenon in this speech".[6]

The distinctive aspect of artistic style from other styles is evident in aesthetic influence: "... the function of aesthetic influence is a peculiar feature of artistic speech."[9] Conversational speech is also used in the artistic style. This is done, on the one hand, for the purpose of individualizing the speech of the protagonists of the work, and, on the other hand, by striving to use untouched words and word forms in the words of the author, a requirement of skill. For example, if the word form "came" is used in speech as "came", the same form can be used by the writer. However, according to the norms of literary language, it is better to use the form "came" in scientific speech, in essays written by students, in order not to deviate from the norms of literary language. If the reader uses the word form, which is typical of the method of speech, in retelling the content of the work, it is correct to use the form -gan edi in creative writing.

There is no mention of the use of incomplete verbs in conjunction with the main verb, as was the case in the past tense forms of the Handbook of "Modern Uzbek Literary Language".[10]

Volume I of the Uzbek Grammar, devoted to morphology, covers the sections "Category of Time" (pp. 475–503) and "Auxiliary Verbs" (pp. 373–417),[8] but does not mention the auxiliary verb in conjunction with the prepositional verb. Such a statement is not even mentioned in the statement on the use of forms such as '-gan edi'. Only the "Incomplete Verb" (pp. 418-442) gives the following explanation of the pronunciation of incomplete verbs in forms such as "-gan edi": "The first sound (e) in incomplete verb forms is unstable: depending on the position, it may switch to another sound or fall. This situation is especially common in oral speech: worked, worked, worked, worked, worked, worked, and so on.

The issues of pronunciation and spelling of words, word forms are covered in detail and extensively in M. Mirtojiev's book "Modern Uzbek language". In this play, the cases of auxiliary verb conjugations are also clearly described.[5]

As for the integration of literature lessons with the native language, the memorization of methodological rules, the teaching of methodological differences in the use of language phenomena, these issues also require special research. In the process of analyzing a work of art, it is important to show the differences between the



style of speech and the style of art. Special attention is paid to the following linguistic phenomena:

- 1) words, word forms, phrases, sentence structures used in a way that is characterized by the style of speech;
- 2) their spelling variants in the literary language;
- 3) the use of words, word forms, phrases, sentence structures, used in the language of the protagonists, less in the words of the author; some are due to the writer's aspirations for individuality;
- 4) the use of linguistic phenomena that reflect the spirit of the period in classical works, especially in poetry.

Words, word forms, phrases, sentence structures that are used in a manner specific to the style of speech are influenced by the requirement of orthoepic norms, with some words (slang, etc.).

Conclusion. In some sentences, the addition of a complement or case at the end of a sentence creates a changed order in the sentences. In linguistics, word order in speech is divided into two groups: ordinary order; changed order. The change in word order in speech is mainly associated with logical emphasis in prose works, while in poetry inversion plays an important role. However, the addition of a complement or case at the end of a sentence is not related to the logical emphasis: this occurs in the context of adding a part of speech that is not remembered at the end of the sentence. For example, in the sentence "... we took "ayron" (beverage with yogurt) out to the reapers" it was added at the end of the sentence because it did not remember to say the word to the reapers in its place. This author's speech was spoken in childish language, so the writer left it in its place.

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UDC: 82.091

TYPOLOGICAL AFFINITIES IN THE EXAMPLE OF TWO NOVELS

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Annotatsiya. Maqolada yigirmanchi asr amerika va o'zbek realistik romanchiligining yorqin namunalari—«Erosmit» va «Uch ildiz» asarlari qiyosiy-tipologik tahlil qilinadi. Malumki, qiyosiy adabiyotshunoslik milliy adabiyotlar o'rtasidagi mushtaraklik va o'ziga xoslikni aniqlashga ixtisoslashgan. Sinkler Lyuis va Pirimkul Qodirov kabi romannavislar ijodida, xususan, realistik romanlarida muayyan o'xshashliklar uchraydi. Lyuis amerika adabiyotida ilk marta Nobel mukofotiga sazovor bo'lgan, uning ijodi esa xorijiy adabiyotshunoslar tomonidan keng tadqiq etilgan. P. Qodirov esa o'zbek nasrchiligi rivojiga ulkan hissa qo'shgan adibdir. Maqolada asarlardagi badiiy konsepsiyaning o'xshash va farqli jihatlari tahlil qilinadi hamda izohlanadi.

Kalit so'zlar: realistik roman, badiiy konsepsiya, konflikt, xarakter, bosh qahramon, janr, tipologik mushtaraklik.

Аннотация. Статья посвящена типологическому сравнительному анализу американских и узбекских реалистических романов XX века - «Эроусмит» и «Три корня». Сравнительная литература специализируется на выявлении общих и уникальных черт национальных литератур. Есть некоторое сходство в художественном творчестве таких писателей, как Синклер Льюис и Пиримкул Кадиров. Льюис был первым американским писателем, получившим Нобелевскую премию по литературе. Что касается П. Кадырова, то он внес огромный вклад в развитие узбекской прозы. В статье анализируются и объясняются общие и разнообразные черты двух романов.

Ключевые слова: реалистический роман, художественная концепция, конфликт, характер, главный герой, жанр, типологическое сходство.

Annotation. The article is dedicated to the typological-comparative analyses of the twentieth century of American and Uzbek realistic novels —“Arrowsmith” and “The Three Roots”. Comparative literature is specialized in identifying common and unique features of national literatures. There are some similarities in the artistic creation of the novelists like Sinclair Lewis and Pirimkul Kodirov. Lewis was the first American writer who got the Nobel prize for literature. As for P. Kadirov, he made an immense contribution in the development of Uzbek prose. The article analyses and explains the common and diverse features of the two novels.

Key words: realistic novel, artistic concept, conflict, character, protagonist, genre, typological similarity.

Introduction. In recent years, systematic activities have been taken in our country to raise the development of culture, art and literature to a new level. “Systematic organization of spiritual and educational work, increasing the effectiveness of



measures taken in this direction, raising the intellectual potential, thinking and worldview of young people, strengthening ideological immunity, educating students as a harmoniously developed generation with a sense of patriotism and service to the people; amplification and implementation of the concept of development of spiritual and moral consciousness” [1] is one of the ideals of our society. The study of the artistic expression of these universal values in the example of literary images puts before our science the obligation to raise the research work to the level of world standards. In recent years, systematic activities have been taken in our country to raise the development of culture, art and literature to a new level. “Systematic organization of spiritual and educational work, increasing the effectiveness of measures taken in this direction, raising the intellectual potential, thinking and worldview of young people, strengthening ideological immunity, educating students as a harmoniously developed generation with a sense of patriotism and service to the people; amplification and implementation of the concept of development of spiritual and moral consciousness” [2] is one of the ideals of our society. The study of the artistic expression of these universal values in the example of literary images puts before our science the obligation to raise the research work to the level of world standards. It is well accepted that the social and scientific importance of comparative literature is in its cross cultural orientation.

Literature analysis. A number of scholars – A.Mirzoeva, R.Gafurova, E. Ochilov, A. Otabekova, N. Namazov, S.Yakubov, U. Sotimov, M.Xolbekov, G.Umurova, O.Rustamov, Sh. Shamusarov, N. Komilov, F.Sulaymonova, G.Xallieva, A. Kosimov made significant contribution to the development of comparative literature in Uzbekistan. It should be noted that comparativist scholars such as R. Etembl, Claudio Guillen and Earl Miner have recognized that comparative research in Eastern and Western literature (East / West Studies. - comment. A. A) is a promising direction.

Research methodology. The article is devoted to the analysis of similar literary approaches used by the writers in character creation in the novels " Arrowsmith" and "The Three Roots" – heroism in the character, the reflection of glory, the synthesis of realistic and romantic style. It should be noted that in the analysis of novels, not only the formal (motif, artistic means, language), but also the content components (artistic idea, aesthetic ideal, conflict) of literary commonality were taken into account. Although “Arrowsmith” and “The Three Roots” are realistic works, the protagonists have aesthetic signs of romanticism. “After all, the protagonist of romantic literature highly values individual freedom and the dignity, opposes any action against them with all being” . Hence, romantic features in the characters were observed in the exaggeration of the heroic spirit in them, in the predominance of the spirit of the struggle in the protagonists, in the construction of the plot in which the main conflict is based on the opposition of the two poles, in the portrait of the characters. Both novels are primarily aimed at instilling in the younger generation a sense of loyalty to the profession, devotion, sincere service to society, and social duty. The typology of romantic characters by V. G. Belinsky was taken into account in the theoretical justification of romantic features in the characters of the novels "Arrowsmith" and "The Three Roots". The characters of the analyzed realistic novels clearly show the



characteristic features of romantic heroes. Based on the classification of the typology of romantic heroes (V. G. Belinsky), we can assume the following: the central characters in the novels "Arrowsmith" and "The Three Roots", Martin and Mahkam, have the characteristics of a "supreme romantic hero". In the novel "The Three Roots", Ochil's characterization matches that of a "sentimental romantic hero". This confirms that in Uzbek literature of the fifties of the twentieth century, romantic elements in realistic prose were active from the point of view of the historical period. These factors enable us to conduct a typological analysis of this phenomenon.

Analysis and results. The plot of the novel "The Three Roots" by Pirimkul Kodirov, is based on a similar motif dominated by the lines of two main characters – Mahkam and Ochil. The events of the novel begin with a conflict, and the exposition is provided in a scattered style. Thus, the fact that the main characters Martin and Mahkam find themselves between two paths, the fierce struggle to find out the truth, are common intentions of the characters. The motif of searching for the truth enabled the authors to express their views on truth. The motif of searching for the truth as the driving force of the plot of the works is repeated in different layers of events, organizing them into a unity.

Martin and Mahkam are distinguished by a constant desire for perfection. No matter how nobly S. Lewis describes Martin, he does not deviate from the aesthetic features of a truly realistic work. The work also realistically reflects Martin's shortcomings. The image of Martin skillfully and convincingly embodies the typical features of a young educated middle-class person of American society of the last century. S. Lewis shows all aspects of Martin's spiritual world: we observe his critical attitude towards himself, his momentary weaknesses, and his mental deviations. Frustrated and depressed, Martin goes so far as to abandon his belief in honesty. The author managed to clearly describe his momentary thoughts of helplessness. Kodirov does not hide from the reader that Makhkam is oversensitive, even cowardly in certain situations, and also superficially judges the events. As a result, the image of a living person with a deeply spiritual world appears before our eyes.

The elation in the speech of the main characters in both novels is of a particular importance. In our opinion, the romantic pathos in the performances of the main characters serves several purposes: first, to reveal the spiritual world of the heroes, second, to reflect the authors' views on truth, goodness, beauty, and, third, to implement an artistic idea.

In Gottlieb's speech about scientists, the author's views are presented with high pathos. And the character of Gottlieb is shown mainly through his speeches. Gottlieb's conversations with Martin give the reader an impression that he is a true fighter for science.

In the character of the main protagonists of the novel "The Three Roots" by Pirimkul Kodirov, there is also a romantic elation, pathos. In the description of the young students, such as Mahkam and Ochil, the qualities of courage, struggle, and intolerance of injustice are observed. Akbarov and Toshev reflect the characteristics of noble scholars, both in their actions and in their speeches. Especially in the image of Akbarov, a speech served as an important means of revealing the character. Although an in-depth psychological analysis of Akbarov is not directly given, he is



one of the central characters of the work. Akbarov's thoughts, his example have a strong impact on Mahkam and his associates. He lectures young people on various educational topics: his monologues on topics such as *"the essence of social work"* [3; p.73], *"the art of writing poetry"* [3; p. 218], *"truth"* [3; p. 403], *"Managerial responsibility"* [3; p. 415] indicate that Akbarov is a good-natured, responsible person. The author describes Akbarov as follows: *"The more he believed in the great future of his students, especially Mahkam and Ochil, the more his faith grew because he worked for these young people."* [3;p.358].

Doubts and suspicions are the essences of Martin and Mahkam. The factors that create internal conflict in the hearts of these characters are a reflection of the ideological struggle that originated in the minds of people from the environment to which the authors belong. In the main characters, S. Lewis vividly and figuratively reflects the materialism that flourished in his time in all spheres of society, as well as in medicine, which required greater devotion. Martin came to contradictory conclusions: the right path is in the priority of material interests – the right path is in the priority of higher ideals. Thus, the author creates situations that make it difficult to implement Martin's ideals, such as honesty, loyalty to duty, impartial service to humanity, and high civic duty. Although the balance between harsh reality and ideals was broken, and the emotions momentarily took over Martin, the main character eventually chooses the path of Good.

Mahkam, like Martin, goes through a path of intense internal struggle. *His greatest ambition is to do valuable work that benefits people more.* Mahkam is not a freshman at the university, but an undergraduate. However, the events of the work revolve around the process of achieving truth in the ideological struggle of Mahkam. Who is right in these conflicts between Khakimov and Eshanbaev? Do historians like Akbarov and Toshev deserve to be punished? The questions raise two conflicting opinions in Mahkam's heart: a right way is an ideological approach to history – a right way is an objective approach to history. For a person living in the atmosphere of the cult of personality, these are not just two opinions that can be logically justified. The choice is the question of life or death for a historian. Formed in an environment where bullying prevails, historians turn historiography into nonsense, and history into a weapon of destruction for honest people. The reason for the slander and moral pressure that befell Toshev and Akbarov is that they remain true to historical truth because they preferred the subordination of historical truth to personal interests.

Conclusion. According to modern comparative views, literary influence and literary reception are equal parts of the creative process. The connection between Eastern and Western literary thought enables the emergence of artistic phenomena in the artistic layers of the works, such as common features: similar themes, motifs, traveling plots. The realistic novels "Arrowsmith" by American writer S. Lewis and "The three Roots" by Uzbek writer P. Kodirov have similarities which can be explained both as a result of mediated forms of internal contact and as typological affinities. Both writers depict their ideals about a contemporary intellectual man and the ethical worldview of men in science. The conflict between a man and society is given through the fate and the outlook of the characters. Despite the social differences, S. Lewis and P. Kodirov apply similar techniques to put moral qualities against various



social ailments. The artistic concept and the art of character creation show common features in the authors prose.

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UDK: 811.512.121'373.423

THE NATURE OF INTERFERENCE AS A PRODUCT OF LINGUOCULTURAL RELATIONS

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Annotatsiya. Tarixiy taraqqiyot nuqtai nazaridan qaraganda, o'zbek tilining leksik qatlamiga fors-tojik, arab, rus va boshqa tillar kuchli ta'sir ko'rsatganini, ularning hammasiga tilga xos bo'lmagan omillar ta'sir qilganini ko'rish mumkin. Tarixda, madaniyatda, moddiy va ma'naviy hayotda, xalqlarning yaqinlashuvi va aloqasi, garchi ular ekstilistik omillar bo'lsa-da, tilning rivojlanishi va aralashuviga faol ta'sir ko'rsatadi. Ushbu maqolada O'rta Osiyoda yashovchi qadimgi Turkiston xalqlari o'rtasidagi lingvomadaniyat aloqalari va ularning o'zbek tilining rivojlanishi va mamlakatimizdagi lingvistik vaziyatga ta'siri yoritilgan. Maqolada bu masalalarning barchasi mashhur ma'rifatparvar Mahmudxo'ja Behbudiyning "Til masalasi" maqolasi hamda o'zbek va tojik adabiyoti poydevorini qo'yib bergan mashhur ikki tilli yozuvchi Sadridin Ayniyning asarlari tili materiallari namunasida tahlil qilingan.

Kalit so'zlar: lingvomadaniy aloqa, interferensiya, Markaziy Osiyo tillari, o'zbek tili, o'zbek-tojik lisoniy aloqalari, Mahmudxo'ja Behbudiy, Sadridin Ayniy.

Annotation. From the point of view of historical development, it can be seen that the lexical layer of the Uzbek language was strongly influenced by Persian-Tajik, Arabic, Russian and other languages, all of which were influenced by non-linguistic factors. In history, culture, material and spiritual life, the rapprochement and connection of peoples, although they are extralinguistic factors, actively influence the development and interference of language. This article describes the linguistic and



cultural ties between the peoples of ancient Turkestan living in Central Asia and their impact on the development of the Uzbek language and the linguistic situation in our country. The article analyzes all these issues in the article "Language issue" by the famous enlightener Mahmudhoja Behbudi and the works of the famous bilingual writer Sadriddin Aini, who laid the foundation of Uzbek and Tajik literature.

Key words: linguocultural communication, interference, Central Asian languages, Uzbek language, Uzbek-Tajik linguistic relations, Mahmudhoja Behbudi, Sadriddin Aini.

Аннотация. С точки зрения исторического развития, можно увидеть, что на лексический слой узбекского языка сильное влияние оказали персидско-таджикский, арабский, русский и другие языки, на все из которых повлияли неязыковые факторы. В истории, культуре, материальной и духовной жизни сближение и соединение народов, хотя и являются экзистенциальными факторами, оказывают активное влияние на развитие и взаимодействие языков. В статье описаны языковые и культурные связи между народами древнего Туркестана, проживающими в Центральной Азии, и их влияние на развитие узбекского языка и языковую ситуацию в нашей стране. Все эти вопросы анализируются в статье известного просветителя Махмудходжи Бехбуди «Языковой вопрос» и произведениях известного двуязычного писателя Садриддина Айна, заложившего основы узбекской и таджикской литературы.

Ключевые слова: лингвокультурная коммуникация, интерференция, языки Центральной Азии, узбекский язык, узбекско-таджикские языковые отношения, Махмудходжа Бехбуди, Садриддин Айна.

Introduction. Changes in the lexical layer of a language are influenced by internal and external factors. Vocabulary is a level that primarily reflects this effect of language and is able to absorb news quickly. Extralinguistic factors that quickly affect the lexicon and make various changes in it include: forms of social system, historical processes, economic, political, cultural and enlightenment relations between peoples and nations, the development of science, development of production and technology, social thinking, human psyche, emotions, laws and decrees on language and writing, etc.

Literature review. From the point of view of historical development, it can be seen that the lexical layer of the Uzbek language was strongly influenced by Persian-Tajik, Arabic, Russian and other languages, all of which were influenced by non-linguistic factors. Nonlinear connections are actually the most common type of linguocultural connections. In history, culture, material and spiritual life, the rapprochement and communication of peoples, although they are extralinguistic factors, actively influence language development and interference.

Linguocultural relations between the peoples of ancient Turkestan living in the Central Asian region and their impact on the development of the Uzbek language and the linguistic situation in our country, including the famous enlightener Mahmudhoja Behbudi's article "Language issues" : *"You need to know Arabic, Persian and Russian. That's why Turks, that is, Uzbeks, - says Behbudi. - Most people in Turkestan speak Uzbek. Persian is the language of madrasa and udabo. Poetry and religious books in all madrassas are in Arabic ... This rule, that is, the textbook is in Arabic, the teacher*



is in Turkish, and the editor and translator is in Persian, is very strang. These three languages have been used in Turkestan since ancient times.” [1]

From Behbudi's notes, it is clear that Arabic words entered our literary language mostly through biblical language and Persian-Tajik language, as well as through oral speech. Assimilation is more of a literary language. At the same time, there are many Arabic words in oral speech, the process of assimilation of which depends on the socio-religious relations and communication between people. The spread of the Arabic language coincides with the period of Uzbek (Turkish) - Arabic, Uzbek - Tajik bilingualism. During this period, many Arabic words entered and assimilated into the Turkic languages. The only reason for this is that our lands were occupied by the Arabs at that time, Islam was propagated instead of Zoroastrianism, and other extralinguistic factors influenced the language. Interference errors in language lexicons are often the result of not being able to find an alternative to a word in another language in one's own language.

Words belonging to the lexical layer of the Persian-Tajik language are more vital than Arabic words and are mixed with the Uzbek lexicon.

Research methodology. These relations have developed on the basis of centuries-old common traditions, cultural ties, the interaction of folklore and literature, and this, of course, is reflected in the language. Especially in the field of fiction, we see that many of our artists have created masterpieces. Alisher Navoi also collected his works in Persian and composed the “Devoni foniy”. They even increased the prestige of the Uzbek (Turkish) language by comparing the two languages of “Muhokamat-ul lugatayn”, proving that the Uzbek language is not inferior to the Persian language. These literary traditions have been firmly established for centuries. Centuries of communicative interference errors, some of which have become the norm over the years. For example, the verb to *speak* is influenced by the Tajik equivalent (*зан задан*), which in Turkic languages actually means *to speak; to say, to slaughter* is represented by a single original verb or a noun *gel*, not by a phrase. The absence of the verb to *speak* in other Turkic languages also indicates the correctness of this opinion.

The verb *зан* (*beat*) is a form of verb used in Tajik to form a compound verb and is used in conjunctions such as *зан зан, ҳаллоз зан, давру-даврон зан ...* It is known that in the Uzbek language, the verb *urmoq* is used in the formation of compound verbs in semi-stable combinations such as *oh urmoq, javlon urmoq: qaygurmoq*. In our language, compound verbs are formed with the help of auxiliary verbs such as *do, be, turn* (but one of them is not involved in the formation of the same verb in the sense of speaking). This means that interference can even affect the level of word formation. In addition, the presence of many prefixes *-be, -ba -no, -dar...* in the formation of new Uzbek words has an impact on the level of word formation.

Let us pay attention to the views of Sadridin Aini, the founder of the new Tajik literature, who lived in the twentieth century, on the intensive connection of the Uzbek and Tajik languages in the linguocultural context. This writer is a typical and perhaps the last representative of the literary environment and social situation dominated by Uzbek-Tajik bilingualism, he is fluent in both languages and has written many of his works in Uzbek and Tajik. [3] The following words belong to S.Ayni:



"As you know, we are brothers with Uzbeks. We drink water from the same river, we eat the same bread, we dress the same, and the customs and traditions of our peoples are the same. We have experienced the blows of life in the same way, and we have fought for independence in the same way." [12]

The well-known writer wrote his works in Uzbek, such as "Slaves", "Memoirs", "Old School", "Death of a sudkhor", "Doxunda", "Odina", and translated them into Tajik. translated by zi. He skillfully used Arabic, Persian, Turkish and Russian lexemes in his work. Consequently, in the speeches of the writer's protagonists, we see the social phenomenon he mentioned above - the way of life, the generality of mentality, and how it is reflected in language. In the process of analyzing S.Aini's work "Odina", it became clear that the author, knowing both languages perfectly, tried to show the richness and charm of each language. We tried to analyze the influence of Persian-Tajik and Arabic on the Uzbek language.

General vocabulary of Persian-Tajik language.

Words used to describe people: *orphan, poor, grandchild, shepherd, master, usurer, friend, foe, child, laborer ...*

Words related to nature: *spring, river, rock, flower, nightingale, dust, sun ...*

Length, time, measurement words: *gas, wedding, week, money ...*

Words denoting things and personalities: *pure, hopeful, cheap, vigilant, sick, remorseful, showy, low, salty, stinky, heroic, remorseful, simple, high ...*

Things horses: *wall, buttocks, bread, threshing, pistachio, sliding, wheel, bench, column, lamp, cotton, lime, threshing ...*

Place Horses: *Square, Stairs, Dungeon, Room, Cave ...*

Names of business processes: *hangoma, wedding, income, bribe, cry, decree, salary ...*

Auxiliary words: *if, sometimes ..., sometimes, rest ..., rest, but, perhaps, whether ..., whether ...*

General vocabulary of the Arabic language.

Words used to refer to people: *aunt, judge, clerk, mufti, cleric, imam, emir, governor, executioner, translator, manager, orphan, captive, lover ...*

Words related to nature: *animal, air ...*

Words related to length, time, measurement, quantity: *volume, calculation, opportunity, duration, now gas, wedding, week, money ...*

Words denoting things and persons: *truth, purity, reflection, disability, useful, hasana, haram, obligatory, natural, eternal, difficult, special ...*

Words: *building, clock, goods ...*

The place words: *warehouse, homeland, park, world, universe, east ...*

Activity-process words: *inheritance, service, debt, upbringing, lust, event, discussion, habit, curse, testament, deposit, permission, divorce, etiquette, exhortation, piety, mystery, event, journey, message, duty, question, answer, calamity, mourning, story, trick, attack, doomsday, complaint, culture, imagination, upbringing, reason, love, vision, migration, discussion, honor, action, spectacle, power ...*

Seven parts of the work were analyzed, and it was found that Sadridin Ayni used 74 Persian-Tajik words (excluding repetitions) and 89 Arabic lexicons (excluding repetitions) in "Odina" written in Uzbek. However, in the Uzbek dictionary, Persian-



Tajik words make up more than Arabic words. This means that if a bilingual knows both languages perfectly, then he will be able to express himself fully and fluently in both languages without any interference errors, using the richness of the vocabulary of each language. in the analysis of “Odina” works.

According to Tajik folklorists, the oral traditions of the Uzbek and Tajik peoples not only interacted with each other, but were so intertwined that it was sometimes difficult to determine their language of origin. can be observed at all levels. [12] As a result of the mixing of Samarkand Tajiks with Uzbeks, folk songs are often sung in two languages. According to B.Shermammedov, such songs, quatrains and bytes are found in the Uzbek language in the Tajik folklore of Samarkand, and these songs are also popular among Uzbeks. Tajiks in Samarkand also know songs that are not found in Uzbek folklore. It can be concluded that such works were created by Tajiks from Samarkand.” [10]

We know that proverbs are conclusions drawn from the life experiences of our ancestors. Proverb - a genre of folklore; short and succinct, figurative, grammatically and logically complete, wise phrase, profound sentence. It has a certain rhythmic shape. The proverbs embody the life experiences of the ancestors, their attitude to society, history, mental state, ethical and aesthetic feelings, and positive qualities. It has been polished among the people for centuries and has become a concise and simple poetic form.[15] The results of the centuries-old Tajik and Uzbek peoples living in the same material, cultural, economic, political, cultural and spiritual conditions in the environment of linguocultural communication and cooperation are clearly reflected in the articles. A.Y.Kalontarov, comparing, studies in two groups: 1) directly equivalent proverbs; 2) articles that are relevant in content but differ in form and vocabulary.[12]

1. There are three types of direct equivalent sentences:

a) articles that are completely consistent with the structure and content of the dictionary, for example,

Sukut alomati rizo.[13]

Avval taom, ba'd az kalom.

Vaqt g'animat.

Tarki odat – amri mahol.

b) the content is exactly the same, the key words are the same, but the sentences differ in grammatical construction and auxiliary words:

For example:

Tajik:

Дар тағзи коса ним коса.

Uzbek:

Kosaning tagida nim kosa.

Tajik:

Чавоби аҳмақ – сукут.

Uzbek:

Ahmoqqa javob – sukut.

Tajik:

Баъд аз тўй нағора.

Uzbek:



To 'ydan keyin nag'ora.

c) seems to be translated by conforming to the content, structure and content of the words, *for example:*

Tajik:

Ангура хӯру боғаша напурс.

Uzbek:

Uzumni ye, bog'ini surishtirma.

Tajik:

Баъд аз тӯй нағора.

Uzbek:

To 'ydan keyin nag'ora.

Tajik:

Сухани рост талх мешавад.

Uzbek:

Haq so 'z– achchiq so 'z.

2. The second group of proverbs includes proverbs that have the same content but different figurative form and lexical structure:

Tajik:

Дарди бадро давои бад.

Uzbek:

Achchiqni achchiq kesar.

Tajik:

Бӯи мушк пинҳон намомонад.

Uzbek:

Dardni yashirsang, isitmasi oshkor qiladi va h.k.

Conclusion. It is clear from these examples that because the Uzbek and Tajik peoples have lived side by side for centuries, the linguistic landscape of the world is similar in both nations, due to their close ties. All these extralinguistic factors are reflected in the language. The above examples are clear evidence of this.

Thus, the interrelation of different languages, neighboring and non-neighboring, brotherly and non-sister, is first seen in the vocabulary of the language. Therefore, in the vocabulary of one language, the linguistic units of another language form a special layer. This is evidenced by the fact that there are many Tajik (Persian) words in the Uzbek lexicon, as well as a large number of Uzbek (Turkish) words in the Tajik lexicon and their real practice.

The first conclusion to be drawn from the article was that if the peoples living side by side over the years had been in regular contact for many years, this language would initially fall as an interference error, moving from an interference error to a literary norm as a result of popularization. tadi.

Second, there are the first changes in the vocabulary, which in oral speech is gradually replaced by written speech.

Thus, the phenomenon of interference is a product of linguocultural relations in the socio-historical context, and in the Uzbek language this phenomenon is most widely reflected in the Uzbek-Tajik linguocultural relations, and it extends from



phonetics to phraseology. There is a need to examine these linguocultural processes at each level of the language, to determine and evaluate its scope.

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UDC: 378.01.811.111

CORPUS INFLUENCED MATERIALS IN TEACHING ENGLISH

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Annotatsiya. Ushbu maqola korpusga asoslangan til materiallarini tadqiq etishga va ularning dars jarayonida ishlatilishiga bag'ishlangan. Korpus lingvistikasining til rivojiga katta ta'siri borligini bir nechta xorij olimlarining ishlarida berilgan. Korpusga asoslangan materiallar dars jarayonida qo'llaniladigan boshqa til materiallaridan farq qiladi, chunki korpus ma'lumotlari yordamida tuzilgan darsliklar talabalarga autentik til namunalarini bilishga va o'rganishga imkon beradi, hamda ushbu materiallar orqali o'rganuvchilarning e'tiborini tortishning amaliy usuli hisoblanadi. Ingliz tilini o'qitishda korpusga asoslangan kitoblarga *Touchstone series*, *Real Grammar*, *focus on Vocabulary* kiradi va ularda berilgan materiallar Britaniya Milliy Korpusi (BNC) va Hozirgi Zamon Amerika (COCA) korpus lug'atlaridan olingan. Lug'at tuzish jarayoni korpus ta'siri ostida rivojlandi. Korpusga asoslangan kitoblar o'quvchilariga o'ziga xos tilning leksik elementlarni, tilda mavjud kontekstlarning eng keng tarqalgan namunalarini taqdim qiladi.

Kalit so'zlar: korpus, korpusga asoslangan, korpus material, korpus sayt, lug'at.

Аннотация. Эта статья посвящена исследованию корпусных языковых материалов и их использования в классе. Вклад корпусной лингвистики в развитие языка даны в работах иностранных лингвистов. Материалы, на базе корпуса отличаются, чем другие материалы, используемые в классе, так как материалы и учебники на базе корпуса имеют аутентичный характер для развития навыков языка характерно на содержащуюся в них информацию влияет корпус. Материалы, основанные на корпусе, являются наиболее практичным способом получения информации, предоставленную корпусом, в руки учащихся. Книги взятые из Британского Национального Корпуса и Американского корпуса (COCA) такие как *Touchstone series*, *Real Grammar*, *focus on Vocabulary* основанные на базе корпуса используются для преподавания английского языка. Процесс создания словарей был революционизирован за счет использования корпусов. Книги на основе корпусов могут предоставить учащимся лексические элементы языка и образцы широко используемых языковых контекстов.

Ключевые слова: корпус, корпусный подход, основа корпуса, корпусные материалы, корпусные сайты, учебники, словари для учащихся.

Annotation. This article explores corpus language materials and their use in the classroom. The contribution of corpus linguistics to the development of the language is given in the works of foreign linguists. Corpus-based materials are different than other materials used in the classroom, as corpus-based materials and textbooks are authentic for the development of language skills in nature but the information they contain is influenced by the corpus. Corpus-based materials are the most practical way



to get the information provided by the corpus into the hands of students. Books from the British National Corpus and the American Corpus (SOSA) such as *Touchstone series*, *Real Grammar*, *focus on Vocabulary* corpus-based are used to teach English. The process of creating dictionaries has been revolutionized by the use of corpus. Corpus-based books can provide learners with lexical elements of a language and examples of commonly used language contexts.

Key words: corpus -based, corpus materials, corpus sites, corpora, textbooks, learner dictionary.

Introduction. In recent years, there has been growing interest in corpus linguistics, corpora in the language classroom and using concordance line for language learning. The contribution of corpus linguistics has changed the language teaching and learning approach in both developing classroom textbooks and creating materials conducted real authentic sources. By the fact, that increasing the awareness of usefulness of teaching materials with the help of corpus research can be seen in grammar, vocabulary books, and dictionaries. U.Romer, O.Keeffe, McCarthy and Carter, Sinclair published seminal papers related with corpus-influenced materials in teaching English. According to R.Reppen mid 1990s, dictionaries based on corpora have been widespread in English as a second language classroom. Also, more and more corpus-based teaching resources such as *Touchstone series*, *Real Grammar*, *focus on Vocabulary* becoming available and growing interest wanting to use in the classroom by teachers. Vocabulary books use information from Coxhead's research on a 3.5 million corpus of written academic language. Concerning the influence of corpus-based materials many corpus studies are done by corpus researchers such as D. Biber, R. Carter, A.Coxhead, G.Bennet, M.Davies, D.Liu, R. Martinez, R.Reppen and others. Language teaching materials have been provided by corpus data and feed into teaching materials. We also know corpus research plays vital role in teaching materials and empirical analysis are given in the works of R. Carter and M.MacCarthy, T.Cobb, L.Flowwedew, E.Friginal, McCarthy and O'Dell.

Method. This article is a descriptive study, exploiting theoretical analyses, which aims to compile information about corpus-based materials such as course books, textbooks, and dictionaries. And also with content analysis Corpus informed materials which was created by using language data of BNC and COCA.

Result. Corpus-influenced materials, as the name suggests are textbooks and other classroom materials featuring presentations and activities that are influenced by corpus findings. Corpus-influenced materials look like other materials used in the classroom, but the information contained within them is influenced by a corpus. Corpus-influences materials are the most practical way to get information provided by corpora into the hands of learners.

According to McCarthy corpus linguistics represents cutting-edge change in terms of scientific techniques and methods, notion of education, roles of teachers, cultural context of the delivery of educational services and mediation of theory and technique.[6] That's why researchers concentrate more attention works related to corpus -based approach in learning and teaching materials.

According to G. Bennet corpus-influenced materials are influenced by language in use observed in a corpus, they provide a more accurate structure of language and

more accurate than traditional materials. [1] The teacher who designed corpus influenced materials, they have to utilize online access corpus data and design them available for the level of the learners. Concerning to the idea of t materials, corpus influenced materials, corpus influenced material developers can use the exact knowledge of language- as it is actually used, provided by a corpus with their own designing ability to the appropriate language activities. However, as noted above the well-known corpus influenced coursebook *Touchstone series* are integrated basic and advanced level. The textbook designed by corpus researchers which influenced by the Cambridge International Corpus of North American English. [7] The *Touchstone series* is attempt to show how coursebook dialogues and syllabus can be informed corpus data. In addition to the conversational four skills syllabus strands of speaking, listening, reading and writing, the *Touchstone* authors provides a syllabus of conversational strategies. The strategies recur throughout the four level of the multi-skills programme and graded. [7]



Figure.1 Extract from the Touchstone series.[10]

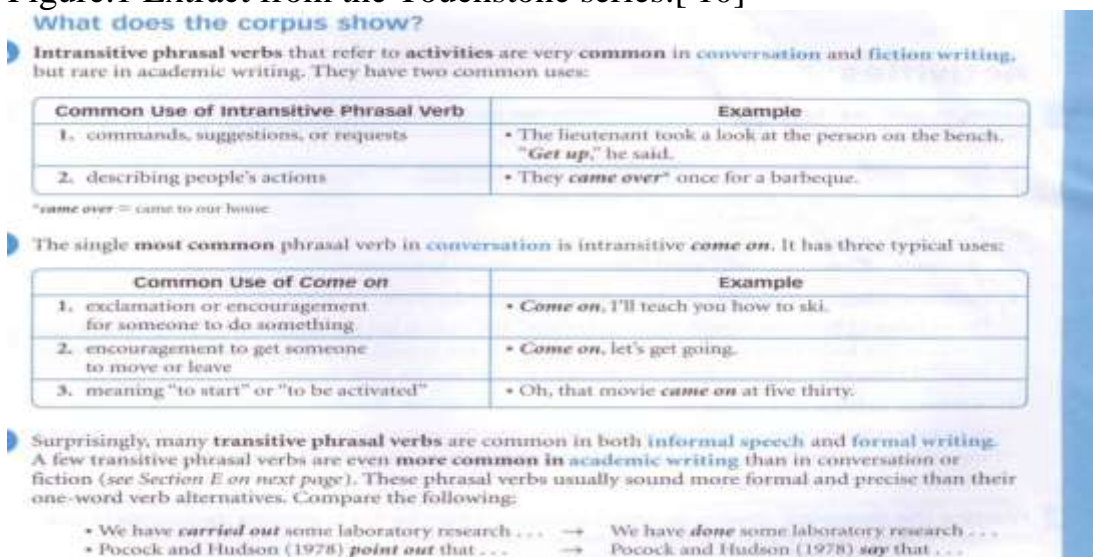


Figure 2.Extract from Real Grammar

In addition to the list of corpus -based materials dictionaries also provided corpus of spoken and written data input. The processes of dictionary making have been revolutionized by the use of language corpora and feeds into language teaching



materials. Researchers based major grammar, dictionaries on large language corpora. The contribution of corpus linguistics to the description of the language is difficult to dispute. As mentioned in R. Reppen for many years ESL, EFL dictionaries have been based on large collection of natural language. These dictionaries include information from corpus and information about how words are used. Learner dictionaries provide powerful tools for students. But dictionaries that are written for native speakers often begin with definitions that may not reflect actual use patterns. It is difficult for the definition to capture real meaning. Using corpus-based learner dictionaries in the classroom can be rich and easily accessible source of activities. [11]

Providing an empirical basis for checking intuitions about language corpora have also brought to light features about language. The language presented in textbooks is based on intuitions about how used language, rather than actual use. According to Carter, Burns, McCarthy and O’Keeffe conversation skills have been changed in recent years with the influence of language corpora. [2] Holmes looked at epistemic modality in ESL textbooks as compared with corpus data and found that many textbooks devoted large amount of attention to modal verbs.[6] Carter. R compares real data from the Cambridge and Nottingham Corpus of Discourse in English with dialogues from textbooks and finds that language features such as discourse markers, vague language, ellipses and hedges. [2]

In recent years awareness of the benefits of using language-teaching material that is based on corpus linguistic research can be seen in vocabulary books based on the Academic Word List. These vocabulary books use information from Averil Coxhead’s research on a 3.5-million-word corpus of written academic language covering a range a range of different disciplines. There are several books now on the market that are based on the information from the Academic Word List. In addition to using to help create reference works and materials for vocabulary teaching, publishers are now using corpora to inform course books. For example, as above mentioned Touchstone is a four-level integrated-skills series that uses material that has been informed by corpus research. [1] Learners can get the information about how words frequently occur, collocate, in conversation goes wrong, information about grammar structure and how these structures are used in different context.

Corpora in language teaching can provide learners authentic language use and internet access source for learning individual or with teacher. In addition to the discussed ways of using corpora in language learning some researcher give their influential suggestion for learners.

The analysis of the research of G.Bennet we see more ready made activities and suggestions how to make corpus-based materials for teachers. As she stated there are three types of pedagogical applications of corpus linguistics such as corpus influences materials, corpus sited texts, corpus-designed activities. [1]

In example of corpus-influenced materials are textbooks and corpus-based activities. In addition to the finding of corpus materials G.Bennet suggests general five ways corpus-influenced materials are beneficial to students.

1. They are based on actual language use, providing a more accurate picture of the language.



2. Their examples, although they may be edited or adapted, are a reflection of authentic language.

3. Their syllabus are informed by frequency information, providing learners exposure to more useful language.

4. They are able to distinguish how different language is used in different registers.

5. They can provide specialized language to particular groups of learners. [1]

Although in the research, corpus-influenced materials and traditional materials distinguished according to feature and function.

1. Corpus-influenced materials can employ common lexical items in specific language patterns. In Thornbury's coursebook *Natural grammar* some examples are explained.[1]

2. Corpus-influenced materials can provide the most common contexts for language patterns. For example, Zwier focuses on a discourse-meaning common in academic writing or spoken presentations and provides key vocabulary for that meaning. [13]

3. Corpus-influenced materials can present targeted vocabulary according to frequency and saliency. For example, Azar focuses on the use of verbs such as work, look, talk, go, and take when presenting use of the perfect aspect.

Corpus-influenced materials offer additional advantages, as well. The most notable advantage to Touchstone, for example is that the text is able to focus strongly on grammatical structures used in conversation, something not often present in other listening-speaking skills, textbooks, which more traditionally emphasize vocabulary acquisition through discussion. Touchstone also effectively incorporates the same vocabulary topics/words as do other speaking-listening texts, such as Let's Talk and Northstar, Listening and Speaking, but with the added advantages of using the most frequent vocabulary found in conversation, such as noting that like is one of the top 15 words in conversation. [7]

First type of corpus influenced books Cambridge University Press authors have access to CIC a-1 billion word corpus of English when writing materials.

1. Touchstone Series (basic through advanced integrated series)

2. Grammar in Use Series (basic and intermediate vocabulary text)

3. Vocabulary in use Series a basic through upper-intermediate vocabulary text)

4. In the Know (intermediate idioms text) [1]

Although university of Michigan Press (UMP) authors use a variety of corpora in materials writing both Building Academic Vocabulary and Teaching a Lexis based Academic writing Course are influenced by Wordbanks Online , a 50 million word corpus of modern English and texts are influenced by the MICASE.

Dicussion. The study has revealed some insights for language teachers about the use of corpus - based materials in language teaching. Teachers can prepare corpus-based materials by taking concordance line and making activities available with their class. However, while making the activities they have to differ advantages of both materials corpus-based and traditional. Next studies we will consider about modern and traditional materials, development in the language classroom and ways of teachers can use corpus-based activities. Because of context materials are differ each other in



terms of authenticity and intuition of materials developers. Many more studies shows that there are many Web sites provide materials and lessons for language teaching. The corpus-based web sites can provide teacher authentic and updated language source in their teaching process.

Conclusion. Corpus-influenced teaching materials provide teachers available language material to use in the classroom. Corpus-informed materials can help teachers to use ready access to contextualized examples of language use that teachers can use corpus examples. Corpus- based books series and dictionaries can give opportunity to use ready made source than from online web corpus sites. They are designed to appropriate level, skill and knowledge. It can be claimed that corpus influenced can help teachers and learners with corpus data.

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UDK: 811.212.

APPLICATION OF LATIN AND GREEK SYNONYMIC MORPHEMES IN MEDICAL TERMINOLOGY OF THE FRENCH LANGUAGE

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Annotatsiya. Mazkur maqolada fransuz tili tibbiy terminologiyasida lotincha va yunoncha sinonimik morfemalarning qo'llanilishi va fransuz tilidan o'zbek tiliga o'zlashgan baynalminal tibbiy terminlar xususida fikr-mulohaza yuritilgan. Bunda xalqaro, chetdan kirib kelgan zamonaviy tibbiy terminlarning so'zlashish jarayoniga kirib kelish sabablari, hamda foydali tomonlari haqida ma'lumot berilgan.

Kalit so'zlar: termin, tibbiy atama, iboralar, xalqaro so'zlar, sinonimik morfema, fransuz tili, lotincha va yunoncha so'zlar.

Аннотация. В этой статье обсуждается использование латинских и греческих синонимичных морфем во французской медицинской терминологии и межэтнических медицинских терминов с французского на узбекский. В нем представлена информация о причинах введения современных международных медицинских терминов, а также об их преимуществах.

Ключевые слова: термин, медицинский термин, словосочетания, интернациональные слова, синонимические морфемы, французские, латинские и греческие слова.

Annotation. This article discusses the use of Latin and Greek synonymous morphemes in French medical terminology and inter-ethnic medical terms from French to Uzbek. It provides information on the reasons for the introduction of modern, international medical terms from abroad, as well as their benefits.

Key words: term, medical term, phrases, international words, synonymous morpheme, French, Latin and Greek words.

Introduction. The adoption of the Law "On the State Language" by the Supreme Soviet of Uzbekistan on October 21, 1989 required a new approach to the terminological lexicon, which is one of the main layers of the Uzbek language vocabulary. We know that the Uzbek people have historically interacted with different peoples. These relations have had a significant impact on the Uzbek language. As a result of the interaction, the Uzbek language's vocabulary has increased due to economic, political and cultural ties. The reason for this, of course, goes back to historical processes. For example: the assimilation of their international words into the Uzbek language under the influence of many peoples (Iran, Macedonia, the Hephthalites, the Turkish Khanate) who invaded our country before the VII century (assimilation word - from one language to another) past tense) and its practical application among the population. The period after the VII century was directly influenced by the Arab invasion and domination of our country, which led to the influence of the Arabic language on our language and the acquisition of new words.

Since the second half of the 19th century, Central Asia, including Uzbekistan, has become a colony of Russia. have mastered.[2]



The introduction of words from Russian into Uzbek includes two historical periods:

1. The period from the second half of the XIX century to the beginning of the XX century.
2. The period after 1917.

Russian is taught in two main ways: orally (the process of communication between the various professions and the local population) and in writing (the process of newspapers, magazines, books, correspondence).

Literature review. According to G.V.Kolshansky, language functions simultaneously both as a product of a person's mental activity and as a form of this activity, and its existence must be based on the conformity (sufficiency) of the reflected objective reality to the mental language process. The great French philosopher and writer V.Gyugo said of the French language: "French is not a language that has stagnated and never will be. No tongue will be hardened, and tongues will sway like the sea." [5]

The authoritativeness of the donor language, the expressiveness of novelty, etc. also act as the most important reason for borrowing. The factor of the authority of the language is of great importance in borrowing precisely the Greek-Latin terms, since, as was revealed earlier, it was Latin that was the language of science, and a huge role in the development processes medical terminology belonged to foreign scientists.

MG Volkova, DO Kozlova, in turn, subdivide all the reasons for borrowing foreign-language lexemes into external and internal [4]. For external reasons, researchers attribute the presence of close trade, economic, political, cultural relations between the peoples who speak the languages. A huge role in the intensification of borrowing processes is played by the political role of the country and language, the constant appearance of new or rethinking of already existing words in order to need to nominate new realities, objects, processes of reality.

Research Methodology. First of all, it should be noted that a medical terminology system can be understood as a set of terms that act as a means of nomination of concepts, one way or another related to medicine, functioning in the professional medical field.

Today, the medical terminology system is one of the most developed and well-developed "in terms of distinguishing between doublet and synonymous formations" [1]. The specificity of the medical sphere of professional activity, the need to achieve optimal interaction, understanding between doctors requires bringing to the unification, standardization of the terms that are used in the communication process, as a result of which, despite the representation in national terminological systems of national lexical units and syntactic constructions, it is Greek-Latin borrowings the leading role is assigned. As a rule, such semantic units are understandable to specialists from different countries, do not cause difficulties in interpreting the meaning of the message, contributing to the optimization of interaction in the professional community. In other words, the main feature of the medical terminology system should be called its consistency and accuracy, "since a person's life depends on the unity of understanding the terms" [8].



Today, Greek-Latin terminology is, according to E.I.Zagrekova, the basis of medical vocabulary, successfully implementing the following functions [8]:

1) plays the role of a system-forming factor, in other words, it is the terms of Greco-Latin origin that constitute the core, the basis of the medical terminology system. Greek-Latin terminology, according to the author, “is a thesaurus of medical science, that is, it includes all the basic concepts and terms of medicine, without the knowledge of which meaningful assimilation of special subjects of medicine is impossible” [1];

2) denotes the basic concepts of medical practice, which ensures the optimization of interaction, unambiguous understanding of the content of communication.

Accordingly, today the medical terminology system is one of the most developed, aimed at increasing efficiency, optimizing the interaction between physicians in the professional field.

Analysis and results. In linguistics, particularly etymology, lexicology, and comparative linguistics, the term “borrowing” refers to the process of inserting a term from another language into a lexicon for a language. The word assimilation can be direct or indirect. Assimilation is one of the tools for speakers to increase their vocabulary, along with neologisms and derivations. The word assimilation is passed from one language to another due to certain socio-historical events, trade and cultural connections. For example:

- Persian-Tajik medical terms - filzahra (stomach ache), tabgirifta (increased blood pressure),

- Medical terms borrowed from the Arabic language - tutqanoq (nervous disease), moxuliyo (melancholy disease), lojuvard (mineral substance), yaraqoni asvad (jaundice)

- Russian medical terms - мигрень (migraine - headache),

Words are the result of relations between nations and states. As a result of the annexation of Central Asia to Russia, Russian and European words were introduced into the Uzbek language. Words entered from Russian and other languages through the Russian language are used in socio-political life, industry, agriculture, science and technology, medicine, art, trade, sports, military, with almost unchanged phonetic aspects. Words are international words.

Similar adjectives are also found in French. Such words are initially neologistic in nature, and then gradually follow the rules of language:

1. Phonetic formation:

a) *artère (nf)* → *артерия* → *arteriya*;

b) *xérophtalmie (nf)* → *ксерофтальмия* → *kseroftalmiya*

2. By adding:

a) *amibe (nf)* → *амеба* → *amyoba + lar*

b) *anti+acide (nf)* → *антацид* → *antatsid+lar*

3. Assimilation by shielding:

a) *lèvre de lièvre* → *зубы зайца* → *quyon lab*

b) *fente palatine* → *волчья пасть* → *bo'ri og'iz*

4. Adaptation of the learned word:

a) *bronchite (nf)* → *бронхит* → *bronxit*;



b) *bactérie (nf)* → *бактерия* → *bakteriya*;

d) *coma (m)* → *кома* → *koma*;

5. The fact that it is a memorized word due to repeated use:

a) *allergie (nf)* → *аллергия* → *allergiya*;

b) *épidémie (nf)* → *эпидемия* → *epidemiya*;

d) *grippe (nf)* → *грипп* → *gripp*;

e) *coronavirus (m)* → *коронавирус* → *koronavirus*

6. Assimilation of international (international) words related to the profession and field:

a) *anatomie (nf)* → *анатомия* → *anatomya*

b) *dermatovenereologie (nf)* → *дерматовенерология* → *dermatovenerologiya* d)

oto-rhino-laryngologie (nf) (ORL) → *отоларингология (ЛОП)* → *otorinolaringologiya*

e) *réanimation (nf)* → *реанимация* → *reanimatsiya*.

Words are the result of relations between peoples and nations. The history of the Russian language shows the cultural, economic and political ties with other peoples, during which the multiplicity of words adopted from the Russian language is strengthened. This process of mastering the words adopted by the Russian language is a positive event, it enriches the language to make it more capable and advanced. This is a common occurrence and even inevitable at certain times.

The Russian dictionary consists of two main groups: 1) words of language ancestors and 2) words from other languages. The acquisition of foreign words is one of the developmental processes of modern language, which is the result of the interaction of elements from one language to another, or they themselves are elements transferred from one language to another.

There are two ways to learn a language: oral and written. Extralinguistic reasons for learning include:

- historical ties of peoples;
- the need to name new objects and new concepts;
- Innovation of the nation in some specific areas of activity;
- fashion, cruelty of language;
- Economics of language resources;
- authority of the source language;

- the proliferation of different social strata for historical reasons, to meet a new word;

- The influence of one culture on another.

Conclusion. It is important to note that these reasons, as a rule, do not exist separately; in most cases, the initiation of borrowing a foreign-language lexeme is determined by a whole complex of reasons and factors.

Accordingly, on the basis of the study, it can be concluded that the medical terminology system is a set of professionally marked lexical units and syntactic constructions, one way or another related to the peculiarities of the implementation of professional activities in the field of medicine, which are used in the process of communicative interaction in the professional community. The main difference of the terminological system is the high degree of its elaboration, accuracy, and uniqueness of terminological units. In the process of its formation, the term system has passed a



long path of historical development, moreover, since ancient times, Greco-Latin borrowings have played a huge role in the formation of the studied term system. At the heart of the appeal to Greco-Roman terms is a whole complex of extralinguistic, intralingual and socio-psychological factors, features of historical development. In conclusion, such terms, which are considered important for medicine, play an important role in our daily lives. At the same time, in a pandemic, medical terms are the most actively used vocabulary in our speech activities.

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MODERN PROBLEMS OF TOURISM AND ECONOMICS

UDK: 332.54 (519.862.6)

IMPROVEMENT OF THE METHODOLOGY OF ECONOMIC AND STATISTICAL ANALYSIS OF THE EFFICIENCY OF AGRICULTURAL PRODUCTS INCLUDED IN THE CONSUMER BASKET

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Annotation: This article describes in detail the process of modeling the effectiveness of including agricultural products in the consumer basket.

Key words: consumer basket, modeling, agricultural products, modeling methodology.

Аннотация: Ушбу мақолада истеъмол саватига кирувчи кишлок хўжалиги маҳсулотлари самарадорлигини оширишни моделлаштириш жараёнлари атрофлича ёритилган.

Калит сўзлар: истеъмол савати, моделлаштириш, кишлок хўжалиги маҳсулотлари, моделлаштириш методикаси.

Аннотация: В данной статье подробно описан процесс моделирования эффективности включения сельхозпродукции в потребительскую корзину.

Ключевые слова: потребительская корзина, моделирование, сельскохозяйственная продукция, методология моделирования.

Introduction. Given the current demand, the issue of econometric modeling of all economic processes is relevant, as it is important to determine the immediate future process, to develop ways to achieve it. In this sense, the research aims to identify ways to increase the efficiency of agricultural products included in the consumer basket, to develop a methodology for modeling the process in defining the tasks to achieve it. In this regard, it is necessary to develop a model that integrates the process as fully as possible so that healthy scientific ideas can be re-used on a regular basis and put into practice, allowing them to make the right decisions.

Therefore, in the planned model for improving the efficiency of agricultural products included in the consumer basket, the factors influencing the process of agricultural production are considered as broadly as possible in accordance with the requirements of correlation analysis. storage and sales processes are taken into account based on the scope of the topic. This, in turn, ensures continuity while maintaining the sequence of models currently being developed, and fills the gap encountered in some models [1].

In general, the creation of a model to simulate the production of agricultural products in the consumer basket, modeling the process of growing crops, covering economic processes associated with agricultural production, the relationship with the

scenario management system, including regional weather conditions and market prices and differs from other research results in that it takes into account the means of planning and processing the results of modeling experiments and conducts simulation experiments to find the best tactics and strategies for process management over several years.

Analysis of the relevant literature. The article describes in detail the process of modeling the efficiency of agricultural products included in the consumer basket. Based on the methodologies of these modeling processes, a scientifically based proposal and recommendation to improve the efficiency of agricultural products included in the consumer basket has been developed.

For example, the well-known economist, academician C.C. Gulyamov in his works pays special attention to the level of provision of the population with goods included in the consumer basket, and concludes that this can be achieved by developing the role of innovation in the country [2]. BE Mamarahimov also studied the issues of consumer baskets and food security. It is desirable to do so at the expense of importing products [3].

Research methodology. The main purpose of the study is to develop scientific and practical proposals and recommendations to improve the efficiency of agricultural products included in the consumer basket. Comparison, grouping and economic-statistical methods were widely used in the research process.

Analysis and discussion of results. In the stages of development of the model of increasing the efficiency of cultivation of agricultural products included in the consumer basket, the input data can be divided into the following groups:

- production costs (labor, material costs for the formation of the insurance fund, for food, per unit of agricultural production);
- results of variables (information on the efficiency and productivity of agricultural crops);
- information on land resources, production, use and sales of agricultural products.

It is worthwhile to study the process of cultivation of agricultural products included in the consumer basket in three financial, agricultural products and scenario data blogs.

Financial block:

$$XHP(t + T) = XHP(t) + (XHT(t) + D(t))T \quad (1)$$

where $XHP(t)$ is the money in the farm account at time t ; $XHT(t)$ - revenues to the economic account; $D(t) - [t, t+T]$ debit from the account for the time interval.

When the model interval $T = 1$, the receipts to the economic account of the $XHT(t)$ are expressed as follows:

$$XHT(t) = Q_0(t) * P_{j0}(t) + Q_1(t) * P_{j1}(t) + K(t) \quad (2)$$

where, $Q_0(t)*P_{j0}(t)$ is the sale of the crop ($Q_0(t)$ is the amount sold in the current time interval, $P_j(t)$ is the current price); $Q_1(t)*p\sigma(t)$ - sales of processed products ($Q_1(t)$ - quantity sold in the current period, $P_{j1}(t)$ - current price); $K(t)$ -debt and other funds, such as subsidies received from the sale of shares.

The discount from $D(t)$ is calculated using the following formula:

$$D(t) = a(t) * p_a(t) + b(t) * p_b(t) + (\overline{\alpha p_a(t)}) + d(t) \quad (3)$$

where, $a(t) * p_a(t)$ is the cost of storage, $a(t)$ is the amount of product stored, $p_a(t)$ is the cost of storage; $b(t) * p_b(t)$ - storage costs of processed products, $b(t)$ - quantity of processed products, $p_b(t)$ - storage costs; $(\overline{\alpha p_a(t)})$ - current agrochemical costs, where α is the vector, the unit cost of its components, purchased fertilizers, plant protection products, seeds, fertilizers, etc., taking into account storage costs. $d(t)$ - current loan payments [5].

In many cases, it is necessary to take into account the acquisition and management of own financial resources in agriculture, including deposits, financial instruments (currency, securities). The balance of production in agricultural production activities - IchB is represented by the following formula:

$$IchB(t + T) = BIM(t) + (YOH(t) - SH(t) - JHY(t) - QIYM(t)) * T \quad (4)$$

where $BIM(t)$ is the amount of primary production; $YOH(t)$ - harvested for the period; Yield sold for $SH(t)$ period; $JHY(t)$ - current yield loss; $QIYM(t)$ - the amount of basic products sent for processing.

After the agricultural products are harvested, one part is brought to the market as a primary product and the other part is sent for processing. The amount of product sent for processing - $QIYM(t)$ is determined on the basis of the following formula:

$$QIYM(t + T) = QIM(t) + (BMQIF(t) - QIMY(t)) * T \quad (5)$$

where $QIM(t)$ is the amount of product processed; $QIMY(t)$ - loss of processed products; $BMQIF(t)$ is a production function of primary product processing that depends on the initial product flow as well as the available capacities.

The main process described in the Agricultural Products blog is the production process, and the cultivation of agricultural crops, as mentioned above, depends on weather, agrochemistry, soil fertility and many other factors. In our opinion, it would be reasonable to consider the growth of agricultural crops as a change in the unit of time - U seeds planted directly in the ground, and on this basis to adopt the following equation.

$$\frac{du}{dt} = y_v u \left(1 - \frac{u}{E_s}\right) * e^{-Lt} \quad (6)$$

where, y_v is the growth rate;

E_s is interpreted as the ecological potential of the environment (soil fertility) and e^{-Lt} . We can reduce this equation to the following form, which can be solved differentially:

$$u(t) = \frac{u_0 * E_s}{u_0 + (E_s - u_0) \exp\left(-\frac{y_v(1 - e^{-Lt})}{L}\right)} \quad (7)$$

where u_0 is the initial value that can be calculated as the number of seeds selected for sowing. As can be seen, we assume that the limiting value is $t \rightarrow \infty$.

$$u_s = \frac{u_0 * E_s}{u_0 + (E_s - u_0) \exp\left(-\frac{y_v}{L}\right)} \quad (8)$$

Of course, the cultivation of agricultural products requires agro-technical measures to ensure food safety during the sowing and cultivation of seeds in the ground, protection of plants from any diseases and pests. In this sense, we consider agrochemical management in fertilization and pest control:

Although pest control decisions are limited at the agricultural level, by government regulation, and limited by the availability of resources, the development of pest control models is one of today's requirements. Pest control efficiency - ZKS increase, $Y(Z)$ represents the amount of crop in case of pest damage, Z - represents all sources of production not related to pest control, such as water, fertilizer and labor. An increase in YZ is observed until Y is close to the maximum potential yield. Let $ZU(N, X)$ denote the percentage of crop lost from pest infestation, where N is the initial population of the pest and X is the pest control efficiency in the presence of pesticides as follows:

$$ZKS = [1 - ZU(N, X)] * Y(Z) \quad (9)$$

Pest control affects product quality and quantity. This is because the price a farmer receives for a commodity is equal to p , which depends on its quality, and it is expressed as follows:

$$p = p[q(N, X, Z)] \quad (10)$$

Here, q shows quality as both an effective and pest control method, as well as an actual pressure measure against pests. Studies show that today, of course, the quality in pest control is increasing, but, for some treatments, such as pesticides, overuse can reduce q . Thus, the benefit from the efficiency of agricultural production - F is calculated as follows:

$$F = p[q(N, X, Z)] * \{[1 - ZU(N, X)] * Y(Z)\} \quad (11)$$

Here, $C(X)$ and $K(Z)$ are compatible pest control and other inputs. As for pesticides, for example, $C(X)$ includes the purchase of pesticides, as well as equipment rental, hiring and monitoring of trained workers. $C(X)$ may also include the costs of mitigating or compensating for environmental or health damage for which the farmer is responsible. In mathematical optimization terminology, F is the target function of the farmer [6].

Of course, these effects can be considered as components of the α vector. In this case, the change in values occurs not immediately, but with delays.

Conclusions and suggestions. In short, this model allows to calculate the cost of production of agricultural products included in the consumer basket, as well as to improve the financial result. Also, the application of the results of modeling will help to analyze and identify the most priority prospects for agricultural activities, to fully meet the consumer needs of the population.

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UDC: 338.1.12

USE OF INNOVATIVE TECHNOLOGIES TO IMPROVE THE QUALITY OF TRANSPORT SERVICES

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Annotatsiya – maqolada transport xizmatlari haqida qisqacha maʼlumot keltirilgan. Shu bilan birga transport xizmatlari sifatini oshirishda innovatsion texnologiyalardan foydalanishning foydali va zararli tomonlari haqida fikr yuritilgan. Bundan tashqari transport xizmatlari sifatini oshirishda innovatsion texnologiyalarning tutgan oʻrni misollar yordamida tahlil qilingan.

Kalit soʻzlar: transport xizmatlari, innovatsion texnologiyalar, mikroavtobus, transport turlari, yoʻlovchilar, innovatsion avtomahsulot.

Аннотация - В статье дается краткий обзор транспортных услуг. При этом обсуждались преимущества и вред использования инновационных технологий для повышения качества транспортных услуг. Кроме того, на примерах проанализирована роль инновационных технологий в повышении качества транспортных услуг.



Ключевые слова: транспортные услуги, инновационные технологии, микроавтобусы, виды транспорта, пассажиры, инновационная автомобильная продукция.

Abstract – The article provides a brief overview of transportation services. At the same time, the benefits and harms of using innovative technologies to improve the quality of transport services were discussed. In addition, the role of innovative technologies in improving the quality of transport services was analyzed using examples.

Key words: transport services, innovative technologies, minibuses, modes of transport, passengers, innovative automotive products.

Introduction. In order to further improve the quality of projects and road construction on the basis of accelerated development of road and transport infrastructure of the country, the introduction of advanced technologies and best international practices, the Action Strategy for the five priority areas of development of the Republic of Uzbekistan In order to comprehensively improve the system of public administration in the field of road construction, a number of reforms are being implemented.

In order to carry out innovations in the field of construction and operation of roads in the Republic of Uzbekistan, it is necessary to improve the quality and service life of roads in accordance with generally accepted international standards and best practices in the field of design and construction of roads; introduction of modern innovative technologies and materials used in road construction.

Literature review. Improving the efficiency of the use of financial resources in road construction, expanding the involvement of international financial institutions and foreign banking institutions in the implementation of projects for the construction and reconstruction of roads of international and national importance, as well as There is also ample opportunity to encourage private investment in the construction of existing roads [1].

First of all, the reforms aimed at the active adoption and effective application of advanced foreign experience and practices in the field of road construction are yielding significant results due to the involvement of large foreign companies and highly qualified specialists in the regions of the country [2].

Analysis. There are also a number of innovations in improving the quality of road use through the active equipping of road maintenance enterprises with modern road construction techniques and repair equipment, including the introduction of effective technologies for leasing and organization of their work [3].

Establishment of joint ventures for the production of modern construction materials and special road construction equipment for road construction in the regions of the country with the participation of leading foreign companies, with the opening of service centers in the future; radical improvement of the system of training, retraining and advanced training of personnel for road construction, including in cooperation with foreign educational institutions and centers in the field, as well as the organization of internship programs for local specialists in leading foreign road construction companies Innovative projects are being implemented by young professionals [4].



Introduce modern standards and technologies to design, build and reconstruct highways by category, as well as to improve the quality and service life of highways during repairs; Extensive measures have been taken in the coming years to develop a program for the construction and reconstruction of public roads, taking into account the prospects of socio-economic development of the republic and regions, as well as the most efficient use of the country's transit potential [5].

Radical improvement of the policy in the field of financing the design, construction, reconstruction and repair of roads, including on the basis of public-private partnership; new ideas are also being tested to encourage the involvement of private sector resources in the construction and operation of roads and to develop recommendations for the comprehensive improvement of public administration mechanisms in the field of road construction [6].

Introduction of advanced foreign experience in the field of landscaping and beautification of roads, development of elements of modern landscape design, development of road infrastructure and construction and reconstruction of roads in the country, as well as Attracting financial resources of foreign credit organizations for the implementation of projects to provide road maintenance enterprises with modern equipment.

Establishment of a center for advanced training and retraining of specialists in the field of construction and repair of roads; opportunities are also being used to facilitate the involvement of advanced techniques and technologies in the construction and operation of highways and to establish cooperation with the German Federal Ministry of Transport and Infrastructure in the field of experience exchange [8].

Discussion. Introduce the principles of public-private partnership in the field of design, construction, reconstruction and overhaul of public roads and regional highways within three months in conjunction with the State Committee for Motor Roads of the Ministry of Finance of the Republic of Uzbekistan Suggestions are included [9].

An autonomous minibus called the ProBUS, based on the latest technology, is designed to carry passengers in a certain direction on the basis of data from driverless sensors. This vehicle is the first innovative automobile product created in our country, which is controlled by "artificial intelligence".

In developed countries, subways and buses operate without a driver [10].

Innovative electric and hybrid cars

In recent years, it is planned to introduce a number of innovations in urban transport:

Gravity systems powered by electricity, hybrids, hydrogen, and natural gas, which are zero or close to zero when the fuel is hydrogen, and have a very low impact on the environment due to pollution and low noise. When it comes to reducing energy consumption, reducing emissions, reducing noise and vibration, "environmentally friendly" technologies include advanced propulsion systems such as electric drive-trains. In fact, low noise emissions are indicated for electric vehicles in the starting, accelerating, and low-speed ranges.

Like hybrid electric cars, it is quieter than usual in any case, because in this case the battery pack is much smaller than in "pure electric" cars. Because of their low



specific energy, “clean electric” vehicles are only used for “space”, but hybrid vehicles (HEVs) seem to be a promising solution because they are different from traditional technology provided by chemical technology. combines the advantages of zi (e.g., good performance autonomy).

Electric vehicles are clean (with zero waste) and quiet, so they can make a significant contribution to reducing waste in cities. However, this is only true in their workplace. If the required electricity / energy is produced normally, large amounts of pollutants will continue to be released. Only if energy is provided by renewable processes (renewable sources) can they be considered real “zero-emission vehicles”.

The range of electric cars with a battery system is from 80 to 100 km. This means that they are not limited to intra-city transport, which can cover a distance of up to 40 km. For distances greater than 100 km, these machines are not an alternative to traditional vehicles with combustion engines. For general use, without range limitations, the most promising solution is a systematic HEV, with a hybrid (thermal and electric) engine (hybrid electric vehicles). Hybrids are equipped with an electric motor as well as an on-board generator such as an energy storage system, ESS (usually batteries), and an FC or Internal Combustion Engine (ICE) that converts fuel energy into electricity. The combination of an emission-free electric motor with the advantages of a combustion engine in terms of range operates in an almost stable state (these pollutant emissions are very low), so it is a complete alternative to conventional motor vehicles.

The electrical storage device is integrated with the power generator:

- brake energy recovery for better performance;
- temporary reduction of engine torque and speed (ICE), thus reducing emissions;

Reduce generator size to maximize ICE efficiency, thereby reducing fuel consumption [11].

Most of these vehicles have a storage system consisting of a high-capacity battery, in some cases combined batteries / ultra capacitors (UC). According to this concept, HEV cars and buses (as well as some trucks) are manufactured by the world’s largest automakers and in some cases are mass-produced. They look like a very promising solution because they provide low emissions of chemical energy storage (fuel) with some advantages of traditional technology (e.g. good performance autonomy), but typically they are ZEV (Zero Emission Vehicles)) it's not. HEV continuity starts with Range extender, small generator electric cars, Dual Mode hybrid cars [12].

Conclusion. In short, the development of regulations on the development of design estimates, the implementation of construction and installation work in the road sector, as well as the procedure for taking into account the volume and quality indicators in their adoption Proposals are being made to bring the national norms and standards for the design, construction, reconstruction and repair of roads and the use of construction materials in the road industry in line with international standards.

Proposals for the introduction of high-tech types of asphalt pavements with the use of modern building materials and additives (polymer-gravel-mastic asphalt



concrete, synthetic fiber mix, micro surfacing, and other modified materials) for future production and application and are scheduled to implement them.

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UDK: 338.48:658.64

WAYS TO IMPROVE IT AND ACTIVITIES OF MARKETING OF NAMANGAN REGIONAL BRANCH "QISHLOQ QURILISH BANK"

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Annotatsiya. Ushbu maqolada Qishloq qurilish bank Namangan mintaqaviy filiali marketing faoliyati va uni takomillashtirish yo`llari haqida so`z yuritilgan. O`zbekiston bozor iqtisodiyoti sari bormoqda va shu yo`lda ko`p qiyinchiliklarga duch kelmoqda. Bu muammolarning yechimi ko`p jihatdan marketingdan qanchalik ijodiy



va maqsadli foydalanishimizga bog`liqdir. Chunki, marketing bozorda muvaffaqiyatli faoliyat yuritishning jahon tajribasi hazinasi hisoblanadi.

Kalit so`zlar: bank, marketing, iqtisod, korxonalar va tashkilotlar, ichki va jahon bozor, yuridik va jismoniy shaxs, menejment.

Аннотация. В данной статье рассматривается маркетинговая деятельность Наманганского регионального отделения Кишлок курилиш банка и способы ее улучшения. Узбекистан движется к рыночной экономике и сталкивается с множеством трудностей. Решение этих проблем во многом зависит от того, насколько творчески и целенаправленно мы используем маркетинг. Ведь маркетинг - это сокровищница мирового опыта успешной работы на рынке.

Ключевые слова: банковское дело, маркетинг, экономика, предприятия и организации, внутренний и мировой рынки, юридические и физические лица, менеджмент.

Annotation. This article discusses the marketing activities of the Namangan regional branch of Qishloq Qurilish Bank and ways to improve it. Uzbekistan is moving towards a market economy and is facing many difficulties along the way. The solution to these problems largely depends on how creatively and purposefully we use marketing. Because marketing is a treasure trove of world experience of successful operation in the market.

Key words: banking, marketing, economics, enterprises and organizations, domestic and world markets, legal entities and individuals, management.

Introduction. The life activities of modern man are based on the consumption of goods and services. Their creation, production, distribution and consumption ensure the dynamic development of human needs. In the state economy, the service sector and the production of goods are organically complementary industries.

The difficulties faced by enterprises and organizations due to the transition to market relations are largely due to the fact that managers of enterprises are not sufficiently familiar with the laws of the market and methods of its study. In the transition to the principles of full self-sufficiency and self-financing, enterprises and organizations have faced an unprecedented phenomenon: there is no demand for their products, and the company's specialists know how to bring it to domestic and world markets. they do not know.[8]

Thus, Uzbekistan is moving towards a market economy and is facing many difficulties along the way. The solution to these problems largely depends on how creatively and purposefully we use marketing. Because marketing is a treasure trove of world experience of successful operation in the market.[6]

By the Decree of the President of our country Shavkat Mirziyoyev, the Action Strategy for the five priority areas of development of Uzbekistan for 2017-2021 was approved. First of all, it should be noted that the implementation of these priorities and the tasks and measures envisaged in them is a vital and social necessity of today. Including ensuring the balance and stability of the national economy, increasing the share of industry, services, small business and private entrepreneurship, accelerated development of services, increasing the role and share of services in GDP It is necessary to radically change the structure of services, first of all, due to modern high-tech types of services.



At the current stage of reforms in the country, the urgent task is to achieve continuous economic growth through the liberalization of the economy, modernization of the country, ensuring macroeconomic stability. This, in turn, is based on the achievements of the economy - a market economy, improving forms of ownership, sharp structural changes in the economy, increasing the share of small business and private entrepreneurship in GDP. In the current period of economic reforms in the country, there is a growing focus on the organization and effective management of marketing activities in service organizations.

The urgency of the topic stems from the need for marketing activities of the Namangan regional branch of Qishloq Qurilish Bank and ways to improve it, the organization and effective management of marketing activities.[5]

Literature review. The organization and effective management of marketing activities in foreign countries have been studied by economists such as A.Smith, F.Kotler, P.Druker, I.Belyaev, Y.Shumpeter, A.V.Chayanov, K.A.Raitsky. They contributed to the development of marketing theory. During the years of independence, our scientists have conducted a number of scientific studies on this topic. In particular, the research of S.S.Gulamov, G.H.Kudratov, Y.Abdullayev, M.S.Kasimova, B.Khodiyeu, S.Soliyeu, A.Buzrukhodjayev, A.Abdullayev and D.Suyunov in this regard. must pass. S.Rayimnazarov, M.Ataniyazova, G.Solieva, B.K.Nabiev, A.L.Gulyamova and others also conducted research on the role and importance of marketing in the banking system.[9]

Research Methodology. Today, marketing is critical to the success of any business entity. Marketing is used not only by business companies, but also by non-profit organizations, such as educational and healthcare institutions, museums and even religious institutions. Analysis and synthesis, induction and deduction, statistical grouping, expert evaluation, scientific abstraction and other methods were widely used in the research process.

Analysis and results. Today there are great changes. The principles of transition to a market economy are being implemented consistently. Interest in the banking sector is growing. Commercial banks are being established, the existing ones are growing and those that cannot compete are disappearing. Other financial institutions are also being created. The modern banking sector is an important sector of the national economy of any country. In recent years, the industry has undergone significant changes. U.S. researchers have described the changes as a "financial revolution." All parts of the banking system are changing. At the same time, the dynamic shifts in the banking system are marked by significant changes.[10]

Modern marketing is considered by experts as a system of organizing all the activities of the bank (firm) for the development, production and sale of goods, services, based on a comprehensive study of the market and the real needs of customers in order to maximize profits.

The creation of a real banking system has led to the need for commercial banks to introduce modern marketing methods and approaches. The internationalization and universalization of banking, increasing competition with foreign banks, as well as the emergence of bank competitors in the form of non-bank institutions: insurance, brokerage, various funds, trade, industry and financial corporations. To survive in the



face of competition, banks must fight for every customer. In this context, bank marketing is of particular importance.[3]

Marketing is a system of management and organization of companies, firms, banks, which takes into account all the processes taking place in the market. Bank marketing is a separate branch of marketing due to its peculiarities. This is the external and internal ideology, strategy, tactics and policy of the bank, determined by a particular socio-political and economic situation. Recent changes in the banking system, the current state of the economy have led to the need for banks to adopt modern marketing methods and techniques.

The universality of banking, its transcendence beyond traditional operations, increased competition with foreign banks, the emergence of competitors in the form of non-bank institutions also require this. In order to win the competition, banks are developing new types of services, new forms of business, putting the interests of shareholders first, and fighting for each customer. At present, bank marketing is considered as a combination of certain technical ways of working with new thinking of bank employees. Marketing is the basis of all banking departments. The market is being studied, the necessary information is being collected, it is being analyzed and strategies for market development are being developed based on it.

Most legal entities and individuals know how to survive, in what areas of economic activity to use their knowledge, skills and abilities to the best of their ability, or how (and where) to maximize the benefits of savings? cares about minimizing losses in the event of losses.

Having studied the views of world scientists on the essence of marketing, we consider it a leading field of economic activity, external and internal ideology, strategy, tactics and policy of the enterprise.[1]

Bank marketing is one of the areas of marketing, which should be aimed at studying the market of credit resources, analyzing the financial condition of customers and, based on this, attracting investments in the bank and forecasting the future behavior of the bank. So, banking marketing is a strategy and philosophy of the bank, which requires thorough preparation, in-depth and comprehensive analysis, and the active work of all departments, regardless of their level. The peculiarities of marketing in the banking sector are primarily due to the specificity of the banking product. In our literature and practice of economics, the term "banking product" appeared during the transition to a market economy and refers to any service or operation performed by the bank.

Selling goods and services is an important task of any business operating in market conditions, because without it, business will inevitably fail. Banking is no exception. Therefore, the purpose of the policy of the bank's management and the activities of all departments are aimed at attracting customers, expanding the range of services sold, occupying the market and increasing profits. This indicates the importance of bank marketing. The content and purpose of banking marketing are changing significantly due to the sharp increase in competition in the banking services market.[4]

Loans provided by the Namangan regional branch of “Qishloq Qurilish Bank” in 2019-2020

(million soums)

№	Total Amount of Loans Allocated		That's it													
			Every family is an entrepreneur		Mortgage loans		Microcredit		Student loan		Consumer credit		Car loan		Loans to legal entities	
1	num ber	amount	num ber	amount	num ber	amount	num ber	amount	num ber	amount	num ber	amount	num ber	amount	num ber	amount
2019	1420	171 697.05	380	5 836.82	825	95 831.96	14	130.35	5	31.34	148	1 663.09	10	1 080.11	38	67 123.40
2020	483	110 548.48	0	-	430	53 169.07	5	54.00	0	-	9	265.50	0	-	39	57 059.91

Today, the commercial bank is able to offer customers about 200 different banking products and services. Wide diversification of operations allows banks not only to retain their customers, but also to increase their number. The activities of modern banks are constantly changing. In this context, an important aspect of bank marketing is to describe a specific banking product or service.[7]

Conclusion. Qishloq Qurilish Bank is one of the largest banks operating in all regions of Uzbekistan. The National News Agency of Uzbekistan has identified the most active and exemplary ministries, organizations, khokimiyats and financial institutions in 2020. Votes from the general public, the media, and bloggers honored the winners in a variety of categories. Qishloq Qurilish Bank won the competition in the nomination "The most active bank in government programs in 2020."

Joint-stock commercial Qishloq Qurilish Bank carries out systematic cooperation with the media in order to ensure openness and transparency in its activities, to provide more information to the public.[2]

Strengthening and improving the quality of the banking and financial system in our country, as well as the emergence of commercial banks as a driving force of the economy and their transformation into large investment institutions is one of the most pressing issues facing our national economy today. Because the financial and economic stability of our country largely depends on the effective functioning of the banking and financial system. It should be noted that these goals can be achieved directly through the integration of the existing banking system into the world economy and the diversification of banking services based on foreign experience.

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UDK-539.3

MATHEMATICAL MODELS OF CURVED AND LINEAR MOTION OF A CAR TAKING INTO ACCOUNT THE ELASTICITY AND DEFORMABLE TIRES**Mamatkabilov Abdilmajid
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Annotatsiya: Maqolada yetarlicha kichik egri chizig`i bo`ylab shinali g'ildiraklaridagi ekipajning kinematik harakat tenglamalari tuzilishi taklif qilingan.

Kalit so'zlar: matematik model, raqamli algoritm, transport vositalari, kompyuter texnologiyasi, tebranish nazariyasi, harakat barqarorligi, hisoblash tajribasi.

Аннотация: В статье предлагается вывод кинематических уравнений движения экипажа на колесах транспорта по криволинейной траектории достаточно малой кривизны.

Ключевые слова: математическая модель, численный алгоритм, транспортные средства, вычислительная техника, теория качения, устойчивость движения, вычислительный эксперимент.

Abstract: The paper proposes the conclusion of the kinematic equations of motion of the crew on balloon wheels along a curved path of sufficiently small curvature.

Keywords: mathematical model, numerical algorithm, vehicles, computer technology, rolling theory, stability of motion, computational experiment.

Introduction. Recent research by scientists has shown that a reasonable reduction in the number of degrees and parameters taken into account does not have a significant effect on a number of practical important parameters of movement. This indicates the need for the most complete study of the properties of simple car models and an increase in the number of degrees of freedom and the number of parameters taken into account only if necessary.

On the one hand, research is underway to more and more fully take into account all the parameters of the bus (their number has already exceeded 120), on the other side, N.A. Fufaev developed a phenomenological theory of rolling, which allows, with a decrease at least by an order of magnitude in the number of parameters taken into account, to construct a tire model that takes into account the general case of deformation and makes it possible to obtain, as special cases, all previously known models of the theory of rolling (I. Rocard, M. V. Keldysh, etc.).

To date, there are certain results on the automation of the stage of drawing up the equations of the disturbed motion of complex nonlinear mechanical systems using the Maple system.

Automation of determining the depth of modeling should provide an opportunity to analyze the influence of certain vehicle parameters on its dynamics (in particular, on



the stability of motion). The ranges of variation of the vehicle parameters (the number of which can reach several hundred) are divided into small intervals, for which a computational experiment is carried out with a consistent simplification of the model. Then, for each interval, the most significant parameters are identified by recognition methods, on the basis of which a simplified car model is automatically built for the corresponding set of parameter values of a complex initial model.

Therefore, the problem arises about the need to automate the compilation of a mathematical model of the disturbed motion of complex mechanical systems (in particular, wheeled vehicles) and the study of the stability of the motion of these systems.

1. ALGORITHM FOR INFERRING A MATHEMATICAL MODEL OF A MECHANICAL SYSTEM

The algorithm for deriving the mathematical model of a mechanical system consists of the following stages:

1. Definition of interconnected parts of a mechanical system;
2. Determination of the generalized coordinate systems q_1, \dots, q_n ;
3. Determination of the expression for the coordinates of the center of mass of interconnected parts of the system through generalized coordinates;
4. Determination of the speed of translational motion of the center of mass of interconnected parts of the system;
5. Determination of the angular velocity of rotation of the movement of the center of mass of the interconnected parts of the system;
6. Determination of the kinetic energy of the interconnected parts of the system;
7. Determination of the kinetic energy of a mechanical system;
8. Determination of non-integrable kinematic equations of the system (for non-holonomic systems);
9. Determination of generalized forces Q_j , acting on a mechanical system (for wheel systems, generalized reaction forces R_j arising from deformation of tires are determined);
10. Based on the results of paragraphs 7, 9, dynamic equations are determined

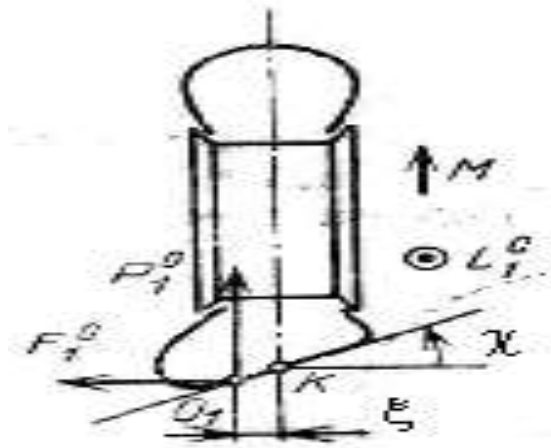
$$\frac{d}{dt} \frac{\partial T}{\partial \dot{q}_j} - \frac{\partial T}{\partial q_j} = Q_j + R_j;$$

11. Combining the results of paragraphs 8, 10, a mathematical model of the system is formed;
12. The end.

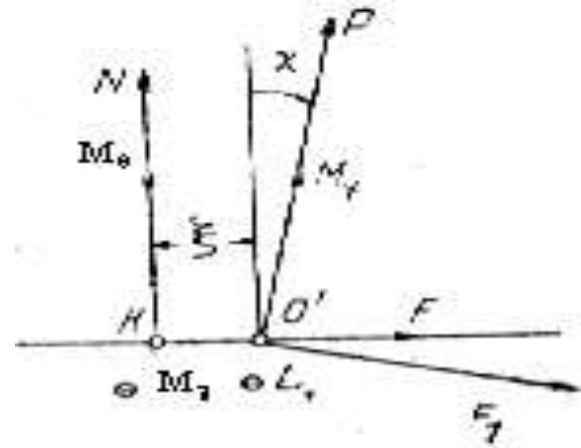
In the work, as an example, the process of automating the compilation of a mathematical model of the movement of a car using the Maple system is described.

Using the procedures **COORDM**, **COORDS**, **KINET**, **KINETUR**, **MOMENTF**, **MMODEL** of the **LAGR** module of the software-instrumental system (**PIS**) **AVTO**, the kinematic relations of the system, kinetic energy of the system, equations of kinematic constraints, forces and moments acting on the wheel from the side of the supporting surface and mathematical model of curvilinear movement of a car taking into account the lateral, angular, longitudinal deformation of tires, wheel inclination and non-potential forces in the tire material. When developing a model, the angles of

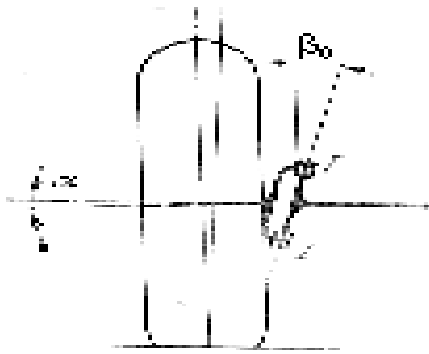
rotation of the left and right wheels of the front axle, the masses of the four wheels and the radii of the wheels are considered unequal.



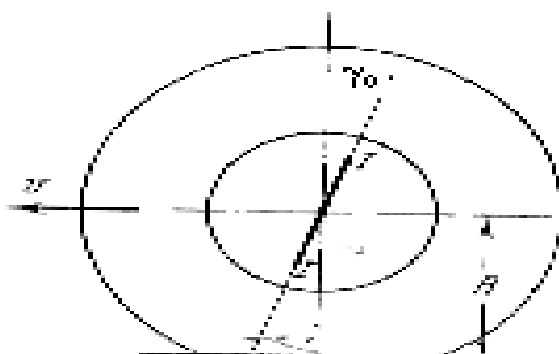
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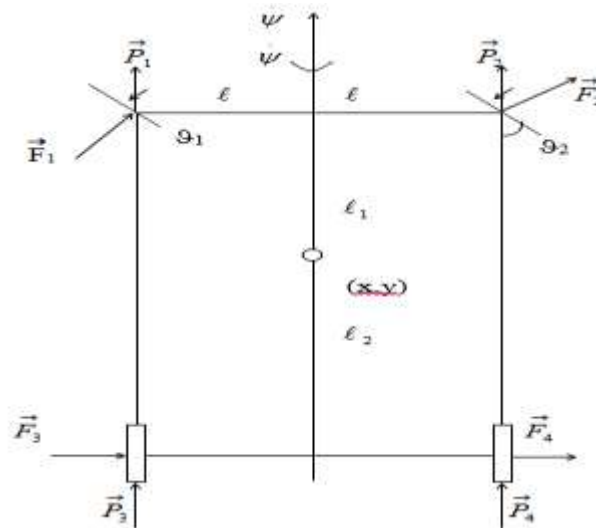
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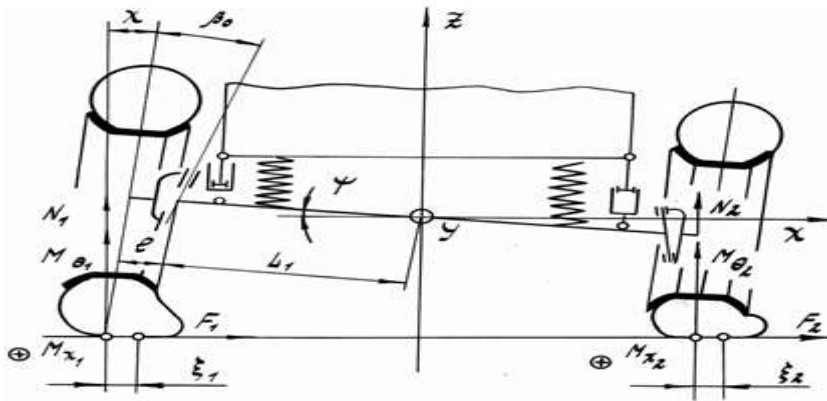
v)



g)

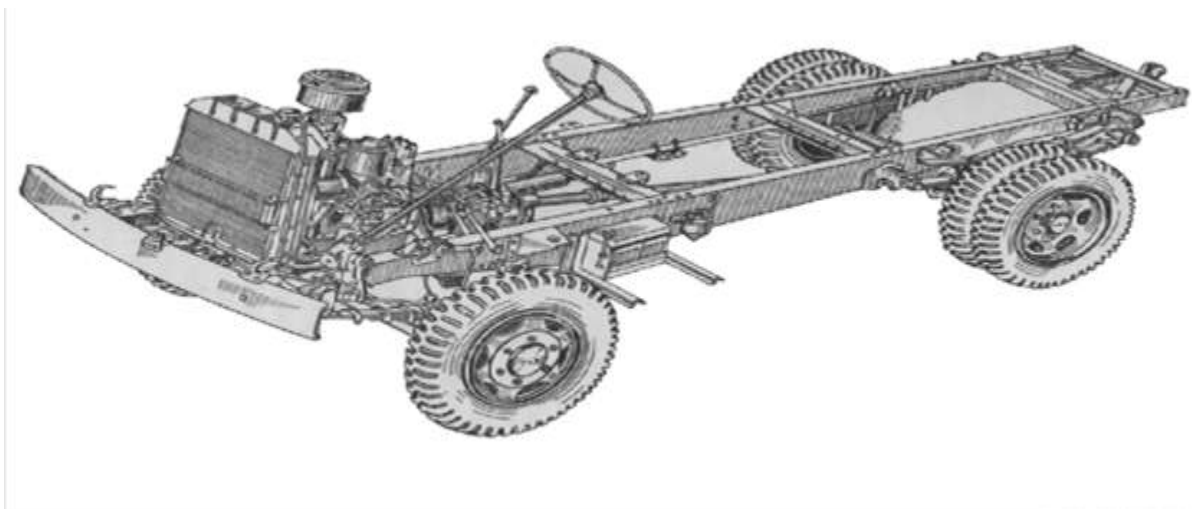


d)



e)

The position of the car is determined by generalized coordinates: x, y, z - coordinates of the center of mass of the vehicle, θ - the angle of rotation of the vehicle around the vertical axis passing through the vehicle masses, θ_1, θ_2 - angles of rotation of the front wheels (left and right) around the pins, ψ - the angle of rotation of the axle of the front suspension together with the wheels around the longitudinal axis of the vehicle, Δ_i ($i = \overline{1,4}$) - wheel rotation angle, also tire deformation parameters, $\xi_1, \xi_2, \xi_3, \xi_4, \varphi_1, \varphi_2, \varphi_3, \varphi_4, \eta_1, \eta_2, \eta_3, \eta_4$ where index 1 and 2 refer to the left and right front wheels, index 3 and 4 refer to the left and right rear wheels (fig.e). Coordinates of the center of mass of the left $C_1(x_{03}, y_{03}, z_{03})$ and right $C(x_{04}, y_{04}, z_{04})$ of the front wheels, the center of mass of the front suspension $O(x_{01}, y_{01}, z_{01})$, the center of mass of the rear axle $B(x_{02}, y_{02}, z_{02})$, the center of mass of the left $D_1(x_{05}, y_{05}, z_{05})$ and right $D(x_{06}, y_{06}, z_{06})$ rear wheels are expressed through the generalized coordinates $\theta, \theta_1, \theta_2, \psi, x, y, z$ of the car.



3. SYSTEMS OF COORDINATES

$\Sigma - OXYZ$ - starting in the middle of the front axle, the OY axis is directed along the velocity vector V , OZ is directed upward; $\Sigma_1 - O_1X_1Y_1Z_1$ - with the origin in the center of the left wheel pivot, axle O_1X_1 , which coincides with the front axle, and the O_1Y_1 axis is parallel to the speed V ; $\Sigma_2 - O_2X_2Y_2Z_2$ - with the origin in the center of the right wheel pivot, the O_2Z_2 axis coincides with the pivot; $\Sigma_3 - O_1X_3Y_3Z_3$: the axes of this coordinate system are rotated by an angle θ_1 around the $O_1Z_2 = O_1Z_3$ axis relative to the

coordinate system Σ_2 ; $\Sigma_4 - O_1 X_4 Y_4 Z_4$: the axes of this coordinate system are rotated by an angle β_0 around the axis $O_1 Y_3 = O_1 Y_4$, so that the axis $O_1 X_4$ coincides with the axis of the left wheel hub.

To transfer from one coordinate system to another coordinate system, using the **COORDM** procedure of the **LAGR** module, transition matrices are formed $A_i^1, A_i^2 (i = \overline{1,4})$.

For the right wheels, the following relations hold: $A_{ij}^1(\beta_0, \vartheta_1) = A_{ij}^2(-\beta_0, \vartheta_2)$, $a_{ij}^1(\beta_0, \vartheta_1) = a_{ij}^2(-\beta_0, \vartheta_2)$. Here, the elements of the matrix $A^1 = A_1^1 \cdot A_2^1 \cdot A_3^1 \cdot A_4^1$, $A^2 = A_1^2 \cdot A_2^2 \cdot A_3^2 \cdot A_4^2$, are the guides of the cosines of the angles between the coordinate systems Σ and Σ_4 , which are necessary to determine the centers of mass of the left and, accordingly, the right wheels of the car.

Using the **COORDS** procedure of the **LAGR** module, we determine the coordinates of the center of mass $O(x_{01}, y_{01}, z_{01})$ - front suspension, $B(x_{02}, y_{02}, z_{02})$ - rear axle, $C_1(x_{03}, y_{03}, z_{03})$ - front left wheel, $C(x_{04}, y_{04}, z_{04})$ - front right wheel, $D_1(x_{05}, y_{05}, z_{05})$ - rear left wheel, $D(x_{06}, y_{06}, z_{06})$ - rear right wheel and (x_0, y_0, z_0) - coordinates of the center of the left kingpin.

Let us now express the angles χ_i, θ_i of the wheels and the coordinates $x_i, y_i (i = \overline{1,4})$ in terms of the generalized coordinates of the system. Here χ_i - is the angle between the axle Oz and the middle plane of the wheel, θ_i - is the angle between the axis Oy and the trace of the middle plane of the wheel on the road, x_i, y_i - are the coordinates of the meeting point of the line of greatest inclination passing in the middle plane of the wheel through its center, with the plane XOY roads:

$$\begin{aligned} \cos\left(\frac{\pi}{2} + \chi_1\right) &= \cos\beta_0 a_{31}^1 + \sin\beta_0 a_{33}^1, & \cos\left(\frac{\pi}{2} + \chi_2\right) &= \cos\beta_0 a_{31}^2 - \sin\beta_0 a_{33}^2, \\ \cos\left(\frac{\pi}{2} + \chi_3\right) &= \sin\beta, & \cos\left(\frac{\pi}{2} + \chi_4\right) &= \sin\beta, & \cos\left(\frac{\pi}{2} - \theta_1\right) &= \cos\beta_0 a_{21}^1 + \sin\beta_0 a_{23}^1, \\ \cos\left(\frac{\pi}{2} - \theta_2\right) &= \cos\beta_0 a_{21}^2 - \sin\beta_0 a_{23}^2, & \cos\left(\frac{\pi}{2} - \theta_3\right) &= \sin\theta, & \cos\left(\frac{\pi}{2} - \theta_4\right) &= \sin\theta, \end{aligned}$$

$$\begin{aligned} x_1 &= x + (-l \cos\psi + l_3 A_{11}^1) \sin\theta - l_1 \sin\theta - r_1 A_{31}^1, & y_1 &= y - l_3 A_{21}^1 \cos\theta + l_1 \cos\theta - r_1 A_{32}^1, \\ x_2 &= x + (l \cos\psi - l_3 A_{11}^2) \sin\theta - l_1 \sin\theta - r_2 A_{31}^2, & y_2 &= y + l_3 A_{21}^2 \cos\theta + l_1 \cos\theta - r_2 A_{32}^2, \\ x_3 &= x + l_2 \sin\theta - L_1 \cos\theta - r_3 \sin\beta \sin\theta, & y_3 &= (y - l_2 \cos\theta - L_1 \sin\theta) \cos\theta, \\ x_4 &= x + l_2 \sin\theta + L_1 \cos\theta + r_4 \sin\beta \sin\theta, & y_4 &= (y - l_2 \cos\theta + L_1 \sin\theta) \cos\theta. \end{aligned} \quad (1)$$

4. KINETIC ENERGY OF THE SYSTEM

The **KINET** procedure displays expressions $V_i (i = \overline{1,6})$ translational speed, projection $\Omega_{jx}, \Omega_{jy}, \Omega_{jz} (j = \overline{1,4})$ instantaneous angular velocity of the center of mass and kinetic energies $T_i (i = \overline{1,6})$ six interconnected bodies, as well as the kinetic energy T of the system under consideration.

$$\begin{aligned} \Omega_{1x} &= -\dot{\Delta}_1 + \dot{\psi} \sin\vartheta_1 + \dot{\theta} A_{31}^1 + \dot{\vartheta}_1 \sin\beta_0, & \Omega_{1y} &= \dot{\psi} \cos\vartheta_1 + \dot{\theta} A_{32}^1, & \Omega_{1z} &= \dot{\psi} A_{23}^1 + \dot{\theta} A_{33}^1 + \dot{\vartheta}_1 \cos\beta_0 \\ \Omega_{2x} &= -\dot{\Delta}_2 + \dot{\psi} \sin\vartheta_2 + \dot{\theta} A_{31}^2 - \dot{\vartheta}_2 \sin\beta_0, & \Omega_{2y} &= \dot{\psi} \cos\vartheta_2 + \dot{\theta} A_{32}^2, & \Omega_{2z} &= \dot{\psi} A_{23}^2 + \dot{\theta} A_{33}^2 + \dot{\vartheta}_2 \cos\beta_0 \\ \Omega_{3x} &= -\dot{\Delta}_3 + \dot{\theta} \sin\beta, & \Omega_{3y} &= 0, & \Omega_{3z} &= \dot{\theta} \cos\beta & \Omega_{4x} &= -\dot{\Delta}_4 - \dot{\theta} \sin\beta, & \Omega_{4y} &= 0, & \Omega_{4z} &= \dot{\theta} \cos\beta \end{aligned}$$



$$V_1 = (\dot{x} - l_1 \cos(\theta)\dot{\theta})^2 + (\dot{y} - l_1 \sin(\theta)\dot{\theta})^2 + \dot{z}^2, \quad V_2 = (\dot{x} - l_2 \cos(\theta)\dot{\theta})^2 + (\dot{y} - l_2 \sin(\theta)\dot{\theta})^2 + \dot{z}^2$$

$$V_3 = (\dot{x} + (l \sin(\varphi)\dot{\varphi} + l_3(-\sin(v_1)\dot{v}_1 \cos(\varphi) - \cos(v_1)\sin(\varphi)\dot{\varphi} + \sin(v_1)\dot{v}_1 \sin(\varphi)\beta_0 - \cos(\varphi)\cos(v_1)\dot{\varphi}\beta_0 + \cos(\varphi)\dot{\varphi}\gamma_0 \sin(v_1) + \sin(\varphi)\gamma_0 \cos(v_1)\dot{v}_1 + \cos(\varphi)\dot{\varphi}\beta_0))\sin\theta + (-l \cos(\varphi) + l_3(\cos(v_1)\cos(\varphi) - \cos(v_1)\sin(\varphi)\beta_0 + \sin(\varphi)\gamma_0 \sin(v_1) + \sin(\varphi)\beta_0) - l_1)\cos(\theta)\dot{\theta}^2 + (\dot{y} - l_3 \cos(v_1)\dot{v}_1 \cos(\theta) - (l_3 \sin(v_1) + l_1)\sin(\theta)\dot{\theta}^2) + \dot{z} + l \cos(\varphi)\dot{\varphi} + l_3(\sin(v_1)\dot{v}_1 \sin(\varphi) - \cos(v_1)\cos(\varphi)\dot{\varphi} + \beta_0 \sin(v_1)\dot{v}_1 \cos(\varphi) + \beta_0 \cos(v_1)\sin(\varphi)\dot{\varphi} - \sin(\varphi)\dot{\varphi}\gamma_0 \sin(v_1) + \cos(\varphi)\gamma_0 \cos(v_1)\dot{v}_1 - \sin(\varphi)\dot{\varphi}\beta_0)^2$$

$$V_4 = (\dot{x} + (-l \sin(\psi)\dot{\psi} - l_3(-\sin(v_2)\dot{v}_2 \cos(\psi) - \cos(v_2)\sin(\psi)\dot{\psi} - \sin(v_2)\dot{v}_2 \sin(\psi))\beta_0 + \cos(v_2)\cos(\psi)\dot{\psi}\beta_0 + \cos(\psi)\dot{\psi}\gamma_0 \sin(v_2) + \sin(\psi)\gamma_0 \cos(v_2)\dot{v}_2 - \cos(\psi)\dot{\psi}\beta_0)\sin(\theta) + (l \cos(\psi) - l_3(\cos(v_2)\cos(\psi) + \cos(v_2)\sin(\psi))\beta_0 + \sin(\psi)\gamma_0 \sin(v_2) - \sin(\psi)\beta_0) - l_1)\cos(\theta)\dot{\theta}^2 + (\dot{y} + l_3 \cos(v_2)\dot{v}_2 \cos(\theta) - (l_3 \sin(v_2) + l_1)\sin(\theta)\dot{\theta}^2) + (\dot{z} - l \cos(\psi)\dot{\psi} - l_3(\sin(v_2)\dot{v}_2 \sin(\psi) - \cos(v_2)\cos(\psi)\dot{\psi} - \beta_0 \sin(v_2)\dot{v}_2 \cos(\psi) - \beta_0 \cos(v_2)\sin(\psi)\dot{\psi} - \sin(\psi)\dot{\psi}\gamma_0 \sin(v_2) + \cos(\psi)\gamma_0 \cos(v_2)\dot{v}_2 + \sin(\psi)\dot{\psi}\beta_0)^2$$

$$V_5 = (\dot{x} + l_2 \cos(\theta)\dot{\theta} + L \sin(\theta)\dot{\theta})^2 + (\dot{y} + l_2 \sin(\theta)\dot{\theta} - L \cos(\theta)\dot{\theta})^2 + \dot{z}^2$$

$$V_6 = (\dot{x} + l_2 \cos(\theta)\dot{\theta} - L \sin(\theta)\dot{\theta})^2 + (\dot{y} + l_2 \sin(\theta)\dot{\theta} + L \cos(\theta)\dot{\theta})^2 + \dot{z}^2$$

$$T_1 = \frac{1}{2} m_3 V_1^2 + \frac{1}{2} B \dot{\psi}^2 + \frac{1}{2} B_1 \dot{\theta}^2, \quad T_2 = \frac{1}{2} m_1 V_2^2 + \frac{1}{2} D \dot{\theta}^2,$$

$$T_3 = \frac{1}{2} m_{21} V_3^2 + \frac{1}{2} \Omega_{1x}^2 + \frac{1}{2} A_1 (\Omega_{1y}^2 + \Omega_{1z}^2), \quad T_4 = \frac{1}{2} m_{22} V_4^2 + \frac{1}{2} \Omega_{2x}^2 + \frac{1}{2} A_2 (\Omega_{2y}^2 + \Omega_{2z}^2),$$

$$T_5 = \frac{1}{2} m_{23} V_5^2 + \frac{1}{2} \Omega_{3x}^2 + \frac{1}{2} A_3 (\Omega_{3y}^2 + \Omega_{3z}^2), \quad T_6 = \frac{1}{2} m_{24} V_6^2 + \frac{1}{2} \Omega_{4x}^2 + \frac{1}{2} A_4 (\Omega_{4y}^2 + \Omega_{4z}^2),$$

$$T = \sum_{i=1}^6 T_i = \frac{1}{2} (\dot{x}^2 + \dot{y}^2 + \dot{z}^2) + [a_1(t)\dot{\theta} + b_1(t)\dot{\psi} + c_1(t)\dot{\varphi}_1 + d_1(t)\dot{\varphi}_2] \dot{x} + [a_2(t)\dot{\theta} + c_2(t)\dot{\varphi}_1 + d_2(t)\dot{\varphi}_2] \dot{y} + [b_3(t)\dot{\psi} + c_3(t)\dot{\varphi}_1 + d_3(t)\dot{\varphi}_2] \dot{z} + [b_4(t)\dot{\psi} + c_4(t)\dot{\varphi}_1 + d_4(t)\dot{\varphi}_2] \dot{z} + A_1(t)\dot{\theta}^2 + (\alpha_1(t)\dot{\psi} + \alpha_2(t)\dot{\varphi}_1 + \alpha_3(t)\dot{\varphi}_2 + c_1(t)\dot{\Delta}_1 + c_2(t)\dot{\Delta}_2 + c_3(t)\dot{\Delta}_3 + c_4(t)\dot{\Delta}_4)\dot{\theta} + \alpha_2(t)\dot{\psi}^2 + (\beta_1(t)\dot{\varphi}_1 + \beta_2(t)\dot{\varphi}_2 + c_1(t)\dot{\Delta}_1 + c_2(t)\dot{\Delta}_2)\dot{\psi} + \gamma_1(t)\dot{\varphi}_1^2 + (c_2(t)\dot{\Delta}_2 + c_1(t)\dot{\Delta}_1)\dot{\varphi}_1 + v_1(t)\dot{\varphi}_2^2 + \frac{1}{2} c_3(t)\dot{\Delta}_3^2 + \frac{1}{2} c_1(t)\dot{\Delta}_1^2 + \frac{1}{2} c_2(t)\dot{\Delta}_2^2 + \frac{1}{2} c_4(t)\dot{\Delta}_4^2 \quad (2)$$

where T_1 - is the kinetic energy of the front suspension, T_2 - is the kinetic energy of the rear of the vehicle without front suspension and wheels, T_3 - is the kinetic energy of the front left wheel, T_4 - is the kinetic energy of the front right wheel, T_5 - is the kinetic energy of the rear left wheel, T_6 - is the kinetic energy of the rear right wheel, Ω_{11} , Ω_{12} , Ω_{13} - is the projection of the instantaneous angular velocity of the front left wheel along the coordinate axes, Ω_{21} , Ω_{22} , Ω_{23} - is the projection of the instantaneous angular velocity of the front right wheel along the coordinate axes, Ω_{31} , Ω_{32} , Ω_{33} - is the projection of the instantaneous angular velocity of the rear left wheel along the coordinate axes, Ω_{41} , Ω_{42} , Ω_{43} - is the projection of the instantaneous angular velocity of the rear the right wheel along the coordinate axes, V_1 , V_2 - speeds of movement of the center of mass of the front suspension and rear axle and V_3 , V_4 , V_5 , V_6 - the speed of movement of the center of mass of the four wheels of the vehicle.

5. EQUATIONS OF KINEMATIC RELATIONS

We will assume that the deformations of the tire are small enough. According to the rolling theory of an elastic tire, due to the small deformation of the tire, we will consider the lateral, longitudinal, angular and radial deformations of the tire.

When the tire deforms, you will get a contact patch, in which there is a whole segment of the midline. Further, from the assumption that the center of the contact area does not slide, it follows that the velocity is zero for any point of this segment. In the case of curvilinear motion, the kinematic equations, meaning the conditions for the wheel to roll without sliding, with the lateral and longitudinal deformation of the tires, are as follows:

$$\begin{aligned} \dot{x}_i \sin(\theta_i + \varphi_i) - \dot{y}_i \cos(\theta_i + \varphi_i) + \dot{\xi}_i &= 0, \\ \dot{\theta}_i + \dot{\varphi}_i - (\dot{x}_i \cos(\theta_i + \varphi_i) + \dot{y}_i \sin(\theta_i + \varphi_i))(\alpha_i \xi_i - \beta_i \varphi_i - \gamma_i \chi_i) &= 0, \\ r_i \dot{\Delta}_i + \dot{\eta}_i + (\dot{x}_i \cos \theta_i + \dot{y}_i \sin \theta_i)[1 + \lambda_i \eta_i - \nu_i (r_{0i} - r_i)] &= 0, \quad (i = \overline{1,4}). \end{aligned} \quad (3)$$

Here $\alpha_j, \beta_j, \gamma_j, \lambda_j, \nu_j$ - kinematic parameters of the tire, χ_i - the angle between the perpendicular to the road and the middle plane of the wheel, φ_i - the angle between the tangent to the curve Γ_i and the axis, which coincides with the trace of the centerline of the wheel plane (tire twist angle), ξ_i - lateral displacement of the centerline tires at the point that coincides with the point K_i during the stationary movement of the car, η_i - is the longitudinal deformation of the tire, θ_i - is the angle between the axis Ox and the trace of the middle plane of the wheel on the road. The quantities $x_i, y_i, \theta_i, \chi_i$ are expressed in terms of generalized coordinates q_1, q_2, \dots, q_n .

The values of the kinematic parameters $\alpha_i, \beta_i, \gamma_i, \nu_i, \lambda_i$ are found experimentally. In the case under consideration, these equations take the form:

$$\begin{aligned} \dot{x}_1 \sin(\theta + \vartheta_1 + \varphi_1) - \dot{y}_1 \cos(\theta + \vartheta_1 + \varphi_1) + \dot{\xi}_1 &= 0, \\ \dot{\theta} + \dot{\vartheta}_1 + \dot{\varphi}_1 - (\dot{x}_1 \cos(\theta + \vartheta_1 + \varphi_1) + \dot{y}_1 \sin(\theta + \vartheta_1 + \varphi_1))(\alpha_1 \xi_1 - \beta_1 \varphi_1 - \gamma_1 \chi_1) &= 0, \\ r_1 \dot{\Delta}_1 + \dot{\eta}_1 + (\dot{x}_1 \cos(\theta + \vartheta_1) + \dot{y}_1 \sin(\theta + \vartheta_1))[1 + \lambda_1 \eta_1 - \nu_1 (r_{01} - r_1)] &= 0, \\ \dot{x}_2 \sin(\theta + \vartheta_2 + \varphi_2) - \dot{y}_2 \cos(\theta + \vartheta_2 + \varphi_2) + \dot{\xi}_2 &= 0, \\ \dot{\theta} + \dot{\vartheta}_2 + \dot{\varphi}_2 - (\dot{x}_2 \cos(\theta + \vartheta_2 + \varphi_2) + \dot{y}_2 \sin(\theta + \vartheta_2 + \varphi_2))(\alpha_2 \xi_2 - \beta_2 \varphi_2 - \gamma_2 \chi_2) &= 0, \\ r_2 \dot{\Delta}_2 + \dot{\eta}_2 + (\dot{x}_2 \cos(\theta + \vartheta_2) + \dot{y}_2 \sin(\theta + \vartheta_2))[1 + \lambda_2 \eta_2 - \nu_2 (r_{02} - r_2)] &= 0, \\ \dot{x}_3 \sin(\theta + \varphi_3) - \dot{y}_3 \cos(\theta + \varphi_3) + \dot{\xi}_3 &= 0, \\ \dot{\theta} + \dot{\varphi}_3 - (\dot{x}_3 \cos(\theta + \varphi_3) + \dot{y}_3 \sin(\theta + \varphi_3))(\alpha_3 \xi_3 - \beta_3 \varphi_3 - \gamma_3 \chi_3) &= 0, \\ r_3 \dot{\Delta}_3 + \dot{\eta}_3 + (\dot{x}_3 \cos \theta + \dot{y}_3 \sin \theta)[1 + \lambda_3 \eta_3 - \nu_3 (r_{03} - r_3)] &= 0, \\ \dot{x}_4 \sin(\theta + \varphi_4) - \dot{y}_4 \cos(\theta + \varphi_4) + \dot{\xi}_4 &= 0, \\ \dot{\theta} + \dot{\varphi}_4 - (\dot{x}_4 \cos(\theta + \varphi_4) + \dot{y}_4 \sin(\theta + \varphi_4))(\alpha_4 \xi_4 - \beta_4 \varphi_4 - \gamma_4 \chi_4) &= 0, \\ r_4 \dot{\Delta}_4 + \dot{\eta}_4 + (\dot{x}_4 \cos \theta + \dot{y}_4 \sin \theta)[1 + \lambda_4 \eta_4 - \nu_4 (r_{04} - r_4)] &= 0, \end{aligned} \quad (4)$$



Substituting the values $x_i, y_i, A_{ij}^1, A_{ij}^2$ (4) using the **KINETUR** procedure, we obtain the kinematic equations of the vehicle motion along a curved path of sufficiently small curvature.

6. FORCES AND MOMENTS ON THE WHEEL FROM THE SIDE OF THE SUPPORT SURFACE

We divide all forces into potential forces, which appear due to the elasticity of the tire, and non-potential ones, associated with friction in the tire material.

According to the theory of motion of systems with rolling [1], the forces acting on the i -th wheel are equivalent to the lateral force F_i and the longitudinal force P_i , P_i applied to the point K_i , M_{θ_i} the moment about the vertical axis z , the moment about M_{χ_i} the longitudinal horizontal axis y and the moment M_i about the transverse axis x . The resulting moments and forces acting on the i -th wheel during lateral deformation of the tires have the form [1]:

$$\begin{aligned} F_{xi} &= a_i \dot{\xi}_i + h_{1i} \dot{\xi}_i + \sigma_i N_i \chi_i + h_{2i} \dot{\chi}_i, & M_{yi} &= -\sigma_i N_i \xi_i - h_{3i} \dot{\xi}_i - \rho_i N_i \chi_i - h_{4i} \dot{\chi}_i, \\ M_{zi} &= b_i \dot{\varphi}_i + h_{5i} \dot{\varphi}_i & (i = \overline{1,4}), \end{aligned} \quad (5)$$

The resulting moments and forces acting on the i -th wheel during longitudinal deformation of the tires are determined by the expressions:

$$\begin{aligned} F_{zi} &= -K_{r_i} r_i' - h_{6i} \dot{r}_i', & F_{yi} &= K_{r_i} \eta_i - N_i^m (a_{F_i} + b_{F_i} |\dot{y}_i|^n), \\ M_{xi} &= \mu_i N_i \eta_i + N_i^m (a_{M_i} + b_{M_i} |\dot{y}_i|^n), & m &= (1 \div 2); \quad n = (2 \div 3), \quad (i = \overline{1,4}), \end{aligned} \quad (6)$$

$a_i, b_i, h_i, k_i, a_{F_i}, b_{F_i}, a_{M_i}, b_{M_i}, \sigma_i, \rho_i, \mu_i$ - Where the coefficients are determined experimentally $r_i' = r_{0i} - r_i$. Generalized forces are calculated by the formulas:

$$\begin{aligned} R_j &= \sum_{i=1}^{11} \left[(F_i \sin \theta_i - P_i \cos \theta_i) \frac{\partial y_i}{\partial q_j} + (P_i \sin \theta_i - F_i \cos \theta_i) \frac{\partial x_i}{\partial q_j} + \right. \\ &\quad \left. + (N_i + F_{zi}) \frac{\partial z_i}{\partial q_j} + M_{\theta_i} \frac{\partial \theta_i}{\partial q_j} + M_{\chi_i} \frac{\partial \chi_i}{\partial q_j} + (r_i P_i + M_i) \frac{\partial \Delta_i}{\partial q_j} \right], \end{aligned} \quad (7)$$

Where F_i - is the transverse force ($F_i = F_{x_i}$), P_i - is the longitudinal force ($P_i = P_{y_i}$), M_{θ_i} - is the moment about the vertical axis $M_{\theta_i} = M_{z_i}$, M_{χ_i} - is the moment about the longitudinal axis $M_{\chi_i} = M_{y_i}$, M_i - is the moment about the transverse axis $M_i = M_{x_i}$.

Using the **MOMENTF** procedure, we find the projection of the generalized reaction forces of the support surface:

$$\begin{aligned} R_x &= F_1 \cos \theta_1 + F_2 \cos \theta_2 + (F_3 + F_4) \cos \theta - P_1 \sin \theta_1 - P_2 \sin \theta_2 - (P_3 + P_4) \sin \theta, \\ R_y &= F_1 \sin \theta_1 + F_2 \sin \theta_2 + (F_3 + F_4) \sin \theta + P_1 \cos \theta_1 + P_2 \cos \theta_2 + (P_3 + P_4) \cos \theta, \\ R_z &= \sum_{i=1}^4 N_i + \sum_{i=1}^4 F_{zi}, \end{aligned}$$



$$\begin{aligned}
R_\theta &= \sum_{i=1}^4 M_{z_i} - (F_1 \cos\theta_1 + F_2 \cos\theta_2)\ell_1 + (F_3 + F_4)\ell_2 + (F_2 \sin\theta_2 - \\
&\quad - F_1 \sin\theta_1)\ell + (P_2 \cos\theta_2 - P_1 \cos\theta_1)\ell + (P_2 \sin\theta_2 - P_1 \sin\theta_1)\ell_1 + (P_4 - P_3)L, \\
R_\psi &= -(r_1 F_1 \cos\theta_1 + r_2 F_2 \cos\theta_2 - r_1 P_1 \sin\theta_1 - r_2 P_2 \sin\theta_2) \cos\beta_0 \cos\gamma_0 - \\
&\quad - (r_3 F_3 + r_4 F_4) \cos\beta + M_{y_1} \cos\theta_1 + M_{y_2} \cos\theta_2 + \sum_{i=3}^4 M_{y_i},
\end{aligned} \tag{8}$$

$$\begin{aligned}
R_{g_1} &= M_{z_1} \cos\beta_0 \cos\gamma_0 - M_{x_1} \sin\beta_0 + P_1 e_1 \cos\beta_0 \sin\gamma_0, \\
R_{g_2} &= M_{z_2} \cos\beta_0 \cos\gamma_0 + M_{x_2} \sin\beta_0 + P_2 e_2 \cos\beta_0 \sin\gamma_0, \\
R_{\Delta_1} &= M_{n_1} = -r_1 P_1 + M_{x_1}, \\
R_{\Delta_2} &= M_{n_2} = -r_2 P_2 + M_{x_2}, \\
R_{\Delta_3} &= M_{n_3} = -r_3 P_3 \cos\beta + M_{x_3} \cos\beta, \\
R_{\Delta_4} &= M_{n_4} = -r_4 P_4 \cos\beta + M_{x_4} \cos\beta,
\end{aligned}$$

Where e_1, e_2 -are the run-in shoulder, respectively, of the left and right front wheels,

$$\theta_1 = \theta + g_1, \quad \theta_2 = \theta + g_2, \quad F_i = F_{x_i}, \quad P_i = F_{y_i}, \quad M_{\theta_i} = M_{z_i}, \quad M_{\chi_i} = M_{y_i}, \quad M_i = M_{x_i} \quad (i = \overline{1,4}).$$

$S_j = (q, \dot{q}, t) \quad (j = \overline{1, 11})$, The generalized forces acting on the system under consideration, in the calculation of which all forces are taken into account, except for the tire deformation forces associated with angles χ_i, φ_i and displacements ξ_i, η_i , already taken into account when looking for the expression $R_j \quad (j = \overline{1, 11})$ have the form:

$$\begin{aligned}
S_\psi &= -k_1 \psi - h_1 \dot{\psi}, & S_{g_1} &= -k_2^1 g_1 - h_2^1 \dot{g}_1, \\
S_z &= -k_3 z - h_3 \dot{z}, & S_{g_2} &= -k_2^2 g_2 - h_2^2 \dot{g}_2, \\
S_\theta &= S_{\Delta_1} = S_{\Delta_2} = S_{\Delta_3} = S_{\Delta_4} = S_x = S_y = 0,
\end{aligned} \tag{9}$$

Where $k_1 = k_1' + C_{pc} \frac{L_{pc}^2}{2} + C_u \frac{4L^2}{2}$ - angular stiffness of the system along the coordinate ψ , k_2^1, k_2^2, k_3 - angular stiffness by coordinates g_1, g_2 and z ,

$$h_1 = h_u \frac{4L^2}{2} + h_{pc} \frac{4L_{pc}^2}{2} + (h_{acc} + h_{aom}) \frac{4L_a^2}{4} + h_c$$

Coefficient of viscous friction along the coordinate ψ , h_2^1, h_2^2, h_3 - coefficients of viscous friction along the coordinates g_1, g_2, z . Here k_1' - angular stiffness of the rod device, C_{pc} -spring coefficient of elasticity, C_u -radial stiffness of the tire, L_{pc} -distance from the center of mass of the system to the spring, h_u, h_{pc}, h_a - internal resistance of the tire, springs and shock absorber, h_c -the coefficient of viscous friction of the rod device. We assume that the damping in the system has linear characteristics within the limits of the change in the generalized coordinates.

7. MATHEMATICAL MODEL OF CURVILINEAR MOTION OF A CAR TAKING INTO ACCOUNT THE ELASTICITY AND DEFORMABILITY OF TIRES, AS WELL AS NON-POTENTIAL FORCES IN THE TIRE MATERIAL

The equations of motion of the vehicle on t balloon wheels, according to the theory of motion of systems with rolling, are written in the form

$$\frac{d}{dt} \frac{\partial T}{\partial \dot{q}_j} - \frac{\partial T}{\partial q_j} = S_j + R_j \quad (j = \overline{1, 11}) \quad (10)$$

where S_j - are the generalized forces acting on the system, R_j - generalized forces due to pneumatic deformation, T - kinetic energy of the considered system, $q_1 = x$, $q_2 = y$, $q_3 = z$, $q_4 = \theta$, $q_5 = \psi$, $q_6 = \vartheta_1$, $q_7 = \vartheta_2$, $q_8 = \Delta_1$, $q_9 = \Delta_2$, $q_{10} = \Delta_3$, $q_{11} = \Delta_4$ - generalized coordinates of the system.

Using the **MMODEL** procedure, substituting the found values of T into $S_{\Delta_x}, \dots, S_{\Delta_4}$ equations (10), we obtain the equations for the dynamics of the curvilinear motion of the car:

$$\begin{aligned} & m\dot{u}_1 + \alpha_5 \ddot{\theta} - (h_{21} + h_{22})\dot{\psi} - 2\sigma N\psi + \gamma_0 \sigma N(\vartheta_1 + \vartheta_2) + \gamma_0 h_{21} \dot{\vartheta}_1 + \gamma_0 h_{22} \dot{\vartheta}_2 - \\ & - a_{12} \dot{\xi}_1 - a_{12} \dot{\xi}_2 - h_{11} \dot{\xi}_1 - h_{12} \dot{\xi}_2 - a_{34} \dot{\xi}_3 - h_{13} \dot{\xi}_3 - a_{34} \dot{\xi}_4 - h_{14} \dot{\xi}_4 = 0, \\ & m\dot{u}_2 + \beta_5 \ddot{\theta} - m_{21} l_3 \ddot{\vartheta}_1 + m_{22} l_3 \ddot{\vartheta}_2 - K_{\tau_1} \eta_1 - K_{\tau_2} \eta_2 - K_{\tau_3} \eta_3 - K_{\tau_4} \eta_4 = 0, \\ & m\dot{u}_3 + \gamma_5 \ddot{\psi} + \gamma_0 m_{21} l_3 \ddot{\vartheta}_1 - \gamma_0 m_{22} l_3 \ddot{\vartheta}_2 - K_{r_1} r_1 - h_{61} \dot{r}_1 - K_{r_2} \dot{r}_2 - \\ & - h_{62} \dot{r}_2 - K_{r_3} r_3 - h_{63} \dot{r}_3 - K_{r_4} r_4 - h_{64} \dot{r}_4 = N_1 + N_2 + N_3 + N_4, \\ & n_5 \ddot{\theta} + n_6 \dot{u}_1 + n_7 \dot{u}_2 + A_1 \ddot{\vartheta}_1 + A_2 \ddot{\vartheta}_2 - \beta C_3 \ddot{\Delta}_3 + \beta C_4 \ddot{\Delta}_4 + 2\sigma N l_1 \psi + (l_1 h_{21} + l_1 h_{22})\dot{\psi} - \\ & - \gamma_0 \sigma N l_1 \vartheta_1 - \gamma_0 h_{21} l_1 \dot{\vartheta}_1 - \gamma_0 \sigma N l_1 \vartheta_2 - \gamma_0 h_{22} l_1 \dot{\vartheta}_2 + a l_1 \dot{\xi}_1 + h_{11} l_1 \dot{\xi}_1 + a l_1 \dot{\xi}_2 + \\ & + h_{12} l_1 \dot{\xi}_2 - a_3 l_2 \dot{\xi}_3 - h_{13} l_2 \dot{\xi}_3 - a_4 l_2 \dot{\xi}_4 - h_{14} l_2 \dot{\xi}_4 - b_1 \varphi_1 - h_{51} \dot{\varphi}_1 - b_2 \varphi_2 - h_{52} \dot{\varphi}_2 - \\ & - b_3 \varphi_3 - h_{53} \dot{\varphi}_3 - b_4 \varphi_4 - h_{54} \dot{\varphi}_4 + K_{\tau_2} l \eta_2 - K_{\tau_1} l \eta_1 + K_{\tau_4} L \eta_4 - K_{\tau_3} L \eta_3 = 0, \\ & m_5 \ddot{\psi} + m_6 \dot{u}_3 + \gamma_0 m_7 \ddot{\vartheta}_1 + \gamma_0 m_8 \ddot{\vartheta}_2 + (a_1 r_1 + \sigma_1 N_1) \xi_1 + (a_2 r_2 + \sigma_2 N_2) \xi_2 + (a_3 r_3 + \sigma_3 N_3) \xi_3 + \\ & + (a_4 r_4 + \sigma_4 N_4) \xi_4 - (\sigma_1 r_1 - \rho_1) N_1 \psi + \gamma_0 (\sigma_1 r_1 - \rho_1) N_1 \vartheta_1 - (\sigma_2 r_2 - \rho_2) N_2 \psi + \\ & + \gamma_0 (\sigma_2 r_2 - \rho_2) N_2 \vartheta_2 - (\sigma_3 r_3 - \rho_3) N_3 \beta - (\sigma_4 r_4 - \rho_4) N_4 \beta + (r_1 h_{11} + h_{31}) \dot{\xi}_1 + (r_2 h_{12} + h_{32}) \dot{\xi}_2 + \\ & + (r_3 h_{13} + h_{33}) \dot{\xi}_3 + (r_4 h_{14} + h_{34}) \dot{\xi}_4 - (h_{21} - h_{41})\dot{\psi} + \gamma_0 (h_{21} - h_{41}) \dot{v}_1 - (h_{22} - h_{42})\dot{\psi} + \\ & + \gamma_0 (h_{22} - h_{42}) \dot{v}_2 = 0, \\ & l_8 \dot{v}_1 + l_5 \dot{u}_2 + l_6 \dot{u}_3 + A l \ddot{\theta} + l_7 \ddot{\psi} - \beta_0 C_1 \ddot{\Delta}_1 + \beta_0 C_2 \ddot{\Delta}_2 - \\ & - b_1 \varphi_1 - h_{51} \dot{\varphi}_1 + (\beta_0 \mu_1 N_1 - \gamma_0 K_{\tau_1} e_1) \eta_1 = 0, \\ & g_5 \dot{u}_2 - \gamma_0 g_5 \dot{u}_3 + A 2 \ddot{\theta} + \gamma_0 g_6 \ddot{\psi} + g_7 \dot{v}_1 - b_2 \varphi_2 - h_{52} \dot{\varphi}_2 + (\beta_0 \mu_2 N_2 - \gamma_0 K_{\tau_2} e_2) \eta_2 = 0, \\ & C_1 (-\beta_0 \dot{v}_1 + \ddot{\Delta}_1) + (r_1 K_{\tau_1} - \mu_1 N_1) \eta_1 = 0, \\ & C_2 (\beta_0 \dot{v}_1 + \ddot{\Delta}_2) + (r_2 K_{\tau_2} - \mu_2 N_2) \eta_2 = 0, \\ & C_3 (-\beta \ddot{\theta} + \ddot{\Delta}_3) + (r_3 K_{\tau_3} - \mu_3 N_3) \eta_3 = 0, \\ & C_4 (\beta \ddot{\theta} + \ddot{\Delta}_4) + (r_4 K_{\tau_4} - \mu_4 N_4) \eta_4 = 0, \end{aligned} \quad (11)$$

Where α_5 , β_5 , γ_5 , n_i ($i = \overline{5, 7}$), m_i ($i = \overline{5, 8}$), l_i ($i = \overline{5, 8}$), g_5 are functions of time and are expressed in terms of the parameters of the system under study.

The system of equations (4) and (11) represent a mathematical model of the curvilinear movement of a car, taking into account the elasticity and deformability of tires (lateral, angular, longitudinal deformation of tires and wheel inclination), as well as non-potential forces in the material of the tire.

Equations (4) and (11) describe the motion of the representing point in the thirty-four-dimensional phase space



$$(x, y, z, \dot{x}, \dot{y}, \dot{z}, \theta, \dot{\theta}, \vartheta_1, \dot{\vartheta}_1, \vartheta_2, \dot{\vartheta}_2, \psi, \dot{\psi}, \Delta_1, \Delta_2, \Delta_3, \Delta_4, \dot{\Delta}_1, \dot{\Delta}_2, \dot{\Delta}_3, \dot{\Delta}_4, \xi_1, \xi_2, \xi_3, \xi_4, \varphi_1, \varphi_2, \varphi_3, \varphi_4, \eta_1, \eta_2, \eta_3, \eta_4).$$

The stationary motion of the system is depicted in this space by a state of equilibrium. From the systems of equations (4) and (11), in particular cases, it is possible to obtain various mathematical models of the car's movement: 1) a mathematical model of the rectilinear movement of the car, taking into account the elasticity and deformable tires; 2) a mathematical model of the rectilinear movement of a car, taking into account the elasticity and deformable tires, as well as non-potential forces in the tire material; 3) a mathematical model of circular motion, taking into account the elasticity and deformable tires; 4) a mathematical model of the curvilinear movement of a car based on the hypothesis of withdrawal; 5) a mathematical model of the curvilinear movement of the car at large values of the kinematic parameters of the tires; 6) a mathematical model of the curvilinear movement of the vehicle at high vehicle speeds, etc.

To automate the study of vehicle stability in the structure of **PIS AVTO** there is an **EAVTO** module. The program code of which is developed in the Delphi environment. Using the **EAVTO** module, the influence of all design parameters on the stability of the vehicle is investigated. As a result of the study, the rational values of the design parameters and the rational area of vehicle stability are determined.

8. STAGES OF THE COMPUTATIONAL EXPERIMENT

8.1 Algorithm and program for deriving the characteristic equation of a system of differential equations

To automate the study of stability of motion of dynamic systems by algebraic methods, it is first of all necessary to solve the problem of generating the characteristic equation of a system of differential equations. In this section, we present an algorithm based on the inversion method for finding the coefficients of the characteristic equation based on the equation of motion of a dynamical system.

Let the system of linear differential equations with n constant coefficients, representing the motion of an arbitrary dynamic system, have the following form:

$$A\ddot{x} + B\dot{x} + Cx = 0, \quad (8.1.1)$$

Where $A = (a_{ij})_{NXN}$, $B = (b_{ij})_{NXN}$, $C = (c_{ij})_{NXN}$ - constant coefficient matrix,

$x = (x_1, x_2, \dots, x_n)^T$ - a column vector of the generalized coordinates of the dynamical system.

Let the coefficients of the differential equation $\alpha, \beta, \gamma, \dots, \tau, \nu$ depend on the parameters:

$$\begin{aligned} a_{ij} &= a_{ij}(\alpha, \beta, \gamma, \dots, \tau, \nu), \\ b_{ij} &= b_{ij}(\alpha, \beta, \gamma, \dots, \tau, \nu), \\ c_{ij} &= c_{ij}(\alpha, \beta, \gamma, \dots, \tau, \nu). \end{aligned}$$

According to the equation of the apparent motion of the dynamic system (8.1.1), the matrix CA (N, 3) must be specified to form the coefficients of the constant matrix A, B, C. Here the elements C (i, 1), C (i, 2), C (i, 3) of the matrix CA (N, 3) consist of symbols \ddot{x}_i , \dot{x}_i , x_i respectively. Thus, with the help of this algorithm, it is possible to automatically obtain the characteristic equation of the differential equations. (8.1) is the characteristic equation of the system of equations will appear:

$$f_0(\lambda) = d_0\lambda^{2n} + d_1\lambda^{2n-1} + \dots + d_{2n-1}\lambda + d_{2n} = 0, \quad (8.1.2)$$



Depending on the values of the elements of the matrices A, B, C, the degree of the characteristic equation can be less than or equal to $2n$ and have a certain number of zero roots. In this case, the degree of the characteristic equation decreases to a number equal to the number of zero roots. In these cases, the characteristic equation looks like this:

$$f(\lambda) = d_0\lambda^m + d_1\lambda^{m-1} + \dots + d_{m-1}\lambda + d_m = 0, \quad (8.1.3)$$

Where $m \leq 2n$, $d_0 d_m \neq 0$.

8.2. General algorithm and program for determining the zone of motion stability

After deriving the characteristic equation of a specific dynamic system, it is necessary to follow the following algorithm (scheme of computational experiments) to study the influence of the calculated parameters on the stability of motion and the boundary of the stability region:

1. Enter the nominal values for the system design parameters.
2. The choice of design parameters for research in the zone of stability and its impact on the border.
3. Enter the change limit and step for the parameters selected in step 2.
4. Select the options required to create the plane stability zone.
5. In step 4, enter the variation limit and step of the selected parameters.
6. Cyclically change the value of the parameters selected in step 2.
7. Cyclically change the value of the parameters selected in step 4.
8. Determination of the coefficients of the characteristic equation.
9. Select any criteria for the study of sustainability.
10. Check the stability conditions.
11. Create a field of sustainability.
12. Refinement of the algorithm.

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ACTUAL PROBLEMS OF NATURAL SCIENCES

UDC: 547.79: 547.431.2: 547.539.2

INHIBITORY AND REGULATORY ACTIVITY OF SOME DERIVATIVES OF 5- EXCHANGED AMINO-1,3,4-THIADIAZOLINE-2-TIONS

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Annotasiya: Maqolada 5-almashgan amino-1,3,4-tiadiazolin-2-tionlar asosida sintez qilingan ayrim kimyoviy birikmalarning ingibitorlik va o'simliklar o'sishini boshqarish xususiyatlari bo'yicha tadqiqot natijalari keltirilgan bo'lib, ular orasidan yorqin ingibitorlik va regulyatorlik xususiyatlarini namoyon qiladigan faol preparatlar sifatida ishlatish mumkin bo'lgan birikmalar aniqlandi.

Kalit so'zlar: Biologik faollik, hosila, o'simlik zararkunandalari, o'sishni tartibga soluvchi, fotosintez, ingibitor, fungisid, gerbisid, begona o'tlar.

Аннотация: В статье представлены результаты исследования ингибирующая и регуляторная активность некоторых химических соединений, синтезированных на основе 5-замещенных amino-1,3,4-тиадиазолин-2-тионов, среди которых есть препараты, которые могут быть использованы в качестве как ярко выраженной ингибиторной и регуляторной активных препаратов.



Ключевые слова: Биологический активность, производный, вредители растение, рост регулятор, фотосинтез, ингибитор, фунгицид, гербицид, сорняк.

Abstract: The article presents the results of research on the inhibitory and plant growth control properties of some chemical compounds synthesized based on 5-exchanged amino-1,3,4-thiadiazoline-2-tions, among which have inhibitory and regulatory properties (can be used as active compounds) compounds were identified.

Keywords: Biological activity, yield, plant pests, growth regulator, photosynthesis, inhibitor, fungicide, herbicide, weed.

Introduction: Along with the creation of intensive varieties and the introduction of new technologies for the cultivation of agricultural crops and their high yields, it is important to develop an integrated system of pest control of these plants.

There is a need for comprehensive chemicalization of agriculture and expansion of the range of chemical means for effective, inexpensive chemical protection of plants.

This, in turn, means that research on the synthesis of new biologically active substances and their testing of drug forms should be further optimized. Of course, to solve these problems it will be necessary to synthesize new compounds based on various heterocyclic compounds and to search for biologically active substances among them. Such heterocyclic compounds include 5- exchanged amino-1,3,4-thiadiazoline-2-tions with three heteroatoms in a five-membered ring.

Due to the presence of an ambifunctional group of thioamide ($-\text{NH}-\text{C}(=\text{S})$) in the molecule of these heterocyclic compounds, they can undergo a two-way reaction depending on the conditions, such properties of which have been widely studied by scientists. It was also found that many new biologically active substances were found among the synthesized compounds, including substances with fungicidal properties [1-4] and herbicide properties [5,6].

This makes it possible to carry out the synthesis of new biologically active substances by further studying the properties of this type of heterocyclic compounds.

Literature review: As noted above, since 5-exchanged amino-1,3,4-thiadiazoline-2-tions and most of their derivatives are different types of biologically active substances, almost all of the research conducted by scientists has focused on the detection of new biologically active substances using synthesized compounds. As a result, many new biologically active compounds have been synthesized from among the synthesized compounds. For example, some 5- exchanged amino-1,3,4-thiadiazole-2-tions and their derivatives have been found to have substances with high insecticidal properties [7,8,9] and bactericidal properties [10-13]. Also, the fact that among the synthesized compounds were found substances with protective properties against various radioactive rays [14], indicates that the specific properties of these types of heterocyclic compounds and their derivatives are of great practical importance.

We reported on our research to find new biologically active compounds among the products of alkylation reactions of 5- exchanged amino-1,3,4-thiadiazoline-2-tions with methyl- and propyl iodides, ethyl-, butyl-, allylbromide, benzylchloride [15]. According to the results of preliminary tests, among the synthesized compounds were found substances that can be used in the preparation of drugs with herbicidal, insecticidal, inhibitory and plant growth-regulating properties, which required further research in this area.



Research methods: Taking into account the above, in the laboratory of phytotoxicology of the Institute of Plant Chemistry of the Academy of Sciences of the Republic of Uzbekistan conducted primary and secondary biotest tests to determine the biological activity of alkyl derivatives synthesized on the basis of 5-exchanged amino-1,3,4-thiadiazoline-2-tions. *Gossypium hirsutum* (cotton stalk) and *Xanthium strumarium* L (cocklebur) plant seed pods were used as biotest objects. The experimental method is based on the fact that the leaves of the seed float in an aqueous nutrient medium, in light, floating on the account of O₂ formed as a result of the process of photosynthesis, and sink in the dark (as a result of the cessation of photosynthesis). In this case, the presence of photosynthesis inhibitors in the incubation environment affects the process of photosynthesis in the leaves of the seed, reducing the formation of oxygen (O₂), and as a result, the seed leaves fall off.

The inhibitory activity of the photosynthetic process of newly synthesized drugs (ED₅₀) is expressed by the molar concentration, which is determined by the deposition of 50% of the discs of seed pods during incubation.

This method allows the detection of inhibitors of photosynthesis even at lower concentrations (10⁻⁷ M, 10⁻⁸ M) [16, 17].

In our previous studies, the inhibitory activity of drugs regulating photosynthesis, respiration, inhibition, and plant growth was tested in biotests *Phaseolus aureus* (Star variety) and *Triticum aestivum* (Bezostaya). Biotest was performed in a solution of drugs with a concentration of 10⁻⁵ M, water was used as a control solution.

Discussion of the results: For this purpose, some alkylation, allylation and benzylation reaction products of 5- exchanged amino-1,3,4-thiadiazole-2-tions and 2-potassium-p-toluidino-1,3,4-thiadiazole salt of cotton and katanak (weed) the effect of the process of photosynthesis on the germination of plant seeds was studied. The test results of the effect of these tions on the photosynthesis process of the corresponding S-, N-alkyl and S-, N-benzoyl derivatives are given in Table 1.

Table 1.

The effect of 5-exchanged amino-1,3,4-thiadiazole-2-tions and their derivatives on cotton and catanac photosynthesis

№	Variant	Conc. (M)	Biotests	The initial number of seed discs (pcs).	the number of sunken disks (%)					
					1 hour	2 hour	3 hour	4 hour	5 hour	6 hour
1	Control	H ₂ O	Cotton Katanak	50,0 50,0	- -	- -	- -	- -	- -	- 2
2	2-Benzoiltio-5-phenylamino-1,3,4-thiadiazole	10 ⁻⁵ M	Cotton Katanak	50,0 50,0	6 8	6 10	8 14	10 14	14 18	18 18
3	2-Benzoiltio-5- morpholino -1,3,4-thiadiazole	10 ⁻⁵ M	Cotton Katanak	50,0 50,0	4 6	4 6	14 10	14 12	17 16	18 20
4	2-Propylthio-5-phenylamino-1,3,4-thiadiazole	10 ⁻⁵ M	Cotton Katanak	50,0 50,0	6 8	10 10	12 16	18 20	19 20	20 22
5	2-(3-Phenoxy-2-hydroxy-propyl)thio-5-p-toluidino-1,3,4-thiadiazole	10 ⁻⁵ M	Cotton Katanak	50,0 50,0	4 6	14 12	18 20	24 22	30 34	34 36
6	2-Methyltio-5-morpholino-1,3,4-thiadiazole	10 ⁻⁵ M	Cotton Katanak	50,0 50,0	6 8	18 22	22 24	45 44	44 58	58 62

7	2-Alliltio-5- <i>p</i> -toluidino-1,3,4-thiadiazol	10 ⁻⁵ M	Cotton Katanak	50,0 50,0	4 10	14 15	14 16	20 22	24 26	28 30
8	2- <i>p</i> -Butiltio-5-morpholino-1,3,4-thiadiazole	10 ⁻⁵ M	Cotton Katanak	50,0 50,0	16 18	24 26	28 39	38 40	40 46	58 62
9	2-Propylthio-5-morpholino-1,3,4-thiadiazole	10 ⁻⁵ M	Cotton Katanak	50,0 50,0	4 6	8 12	8 20	24 22	30 34	34 40
10	3-Alliltio-5-morpholino-1,3,4-thiadiazolin-2-tion	10 ⁻⁵ M	Cotton Katanak	50,0 50,0	6 8	14 20	28 36	38 40	46 40	54 52
11	2-Potassium- <i>p</i> -toluidino-1,3,4-thiadiazole salt	10 ⁻⁵ M	Cotton Katanak	50,0 50,0	4 6	8 10	8 10	14 12	16 14	24 20
12	2-Benzoiltio-5- <i>p</i> -toluidino-1,3,4-thiadiazole	10 ⁻⁵ M	Cotton Katanak	50,0 50,0	7 6	8 8	12 14	16 17	21 24	28 29

Biotest results showed that the inhibition of drugs prepared from 2-methylthio-5-morpholino-1,3,4-thiadiazole, 2-*n*-butylthio-5-morpholino-1,3,4-thiadiazole and 3-alliltio-5-morpholino-1,3,4-thiadiazoline-2-tions was high. After 6 hours of incubation in these variants, the number of drooping seed leaf discs exceeded 50%. Other drugs did not significantly affect the process of photosynthesis of seed leaf discs.

Therefore, 2-methylthio-5-morpholino-1,3,4-thiadiazole, 2-*n*-butylthio-5-morpholino-1,3,4-thiadiazole and 3-alliltio-5-morpholino-1,3,4-thiadiazoline-2-tions are of interest for our further research as an inhibitor of photosynthesis. For this purpose, the inhibitory and plant growth control properties of alkylation, allylation and benzylation reaction products of 5-exchanged amino-1,3,4-thiadiazole-2-tions and 2-potassium-*r*-toluidino-1,3,4-thiadiazole salt were studied. The data obtained are presented in Table 2.

Table 2

Peraparatlarning brakes and inhibitory properties

№	Variant	Conc. (M)	Biotests	Plant sprouts (%)	Root length		Root length	
					mm.	%.	mm.	%
1	Control	H ₂ O	Mung bean Wheat	50,0 50,0	- -	- -	- -	- -
2	2-Benzoiltio-5-phenylamino-1,3,4-thiadiazole	10 ⁻⁵ M	Cotton Cocklebur	50,0 50,0	6 8	6,0 10,0	8 14	9,5 16,5
3	2-Benzoiltio-5-morpholino-1,3,4-thiadiazole	10 ⁻⁵ M	Cotton Cocklebur	50,0 50,0	4 6	4,0 6,0	14 10	16,5 12,0
4	2-Propylthio-5-phenylamino-1,3,4-thiadiazole	10 ⁻⁵ M	Cotton Cocklebur	50,0 50,0	6 8	10,0 10,0	12 16	14,4 19,5
5	2-(3-Phenoxy-2-hydroxypropyl)thio-5- <i>p</i> -toluidino-1,3,4-thiadiazole	10 ⁻⁵ M	Cotton Cocklebur	50,0 50,0	4 6	14,0 12,0	18 20	24,0 27,0
6	2-Methyltio-5-morpholino-1,3,4-thiadiazole	10 ⁻⁵ M	Cotton Cocklebur	50,0 50,0	6 8	18,0 22,0	22 24	34,8 38,9
7	2-Alliltio-5- <i>p</i> -toluidino-1,3,4-thiadiazol	10 ⁻⁵ M	Cotton Cocklebur	50,0 50,0	4 10	14,0 15,0	14 16	18,0 21,0
8	2- <i>p</i> -Butiltio-5-morpholino-1,3,4-thiadiazole	10 ⁻⁵ M	Cotton Cocklebur	50,0 50,0	16 18	24,0 26,0	28 39	44,0 63,0
9	2-Propylthio-5-morpholino-1,3,4-thiadiazole	10 ⁻⁵ M	Cotton Cocklebur	50,0 50,0	4 6	8,0 12,0	8 20	10,7 28,0
10	3-Alliltio-5-morpholino-1,3,4-thiadiazolin-2-tion	10 ⁻⁵ M	Cotton Cocklebur	50,0 50,0	6 8	14,0 20,0	28 36	43,0 55,0



11	2-Potassium- <i>p</i> -toluidino-1,3,4-thiadiazole salt	10^{-5} M	Cotton Cocklebur	50,0 50,0	4 6	8,0 10,0	8 10	10,0 12,0
12	2-Benzoilthio-5- <i>p</i> -toluidino-1,3,4-thiadiazole	10^{-5} M	Cotton Cocklebur	50,0 50,0	7 6	8,0 8,0	12 14	15,4 18,1

Conclusions:

1. Preliminary test results showed that drugs based on derivatives of 5-exchanged amino-1,3,4-thiadiazoline-2-tions have a significant effect on the process of photosynthesis compared to the control solution.
2. Also 2-methylthio-5-morpholino-1,3,4-thiadiazole, 2-*n*-butylthio-5-morpholino-1,3,4-thiadiazole and 3-alliltio-5-morpholino-1,3,4-thiadiazoline-2-tions were found to exhibit high photosynthetic inhibitory activity. This requires a more extensive study of the photosynthetic inhibition and plant growth control properties of these compounds.

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UDC: 1.13.17

**THE ISSUES OF SPIRITUAL MATURITY IN JALAL AD-DIN RUMI'S
VIEWS ON SPIRITUAL AND MORAL VALUES**

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Abstract: At the current stage of rapid development, the issues such as respect for spiritual and moral values, preservation of historical heritage and the restoration and appreciation of national traditions are in the center of global attention. At present, a special attention is paid to the issues of human spirituality and moral development. In this article in his views on spiritual and moral values, special attention is paid to the issue of *nafs* (selfhood) and its control.

Keywords: value, culture, mysticism, morality, patience, goodness, mythology, axiology, sociology, anthropology.

Annotasiya: Kundan-kunga shiddat bilan rivojlanayotgan tarqqiyotning hozirgi zamon bosqichida ma'naviy-axloqiy qadriyatlarni e'zozlash, tarixiy merosni asrash va milliy an'analarni tiklash, qadrlash kabi masalalar bilan bog'liq muammolar butun dunyo afkor ommasining e'tibor markazida turibdi. Bugungi kunda inson ma'naviyati va axloqiy kamolotini yuksaltirish masalalariga ham alohida e'tibor qaratilmoqda. Ushbu maqolada uning ma'naviy-axloqiy qadriyatlarga doir qarashlarida nafs tarbiyasi, nafsni jilovlash kabi masalalarga ham alohida e'tibor qaratilgan.

Kalit so'zlar: qadriyat, madaniyat, tasavvuf, axloq, sabr, yaxshilik, mifologiya, aksiologiya, sosiologiya, antropologiya.

Аннотация: На нынешнем этапе стремительного развития такие вопросы, как уважение духовных и нравственных ценностей, сохранение исторического наследия, восстановление и признание национальных традиций, находятся в центре внимания мировой общественности. Сегодня особое внимание уделяется вопросам духовности и нравственного развития человека. В этой статье рассматриваются взгляды ученого на духовно-нравственные ценности особое внимание уделяется таким вопросам, как воспитание личности и контроль над личностью.

Ключевые слова: ценности, культура, мистика, мораль, терпение, добро, мифология, аксиология, социология, антропология.

Introduction. Attaining the spiritual and moral perfection of the human has been considered urgent issue at every phase of world civilization. At the current stage of advancement, where spiritual threats (dangers) and moral depravity are growing on a global scale, there is a dire need to develop people's spiritual immunity, moral qualities and effective use of the spiritual heritage of Eastern philosophers because in the works of Eastern thinkers we can find universal criteria for achieving human spiritual and moral maturity applicable for any social space and time. They are very essential in



terms of up-to-date analysis and raising their application to a new level is equally important to solve the existed problems.

In the East, the ideas about various values began to develop in the VIII-XII centuries, and the history of the development of such views goes to folklore, the philosophical worldview of antiquity and the historical genesis of legends, myths, stories and parables created in the ancient East.

Literature Review. The study and analysis of the concept of values has been a topical issue at all times. Aristotle, one of the great representatives of the philosophy of antiquity, said that the most precious of values is that which brings us pleasure in living happily, and helps us to do good deeds [4: p.254]. Abu Nasr al-Farabi, a renowned early Islamic philosopher known in the East as the “*Muallimi soniy*” (the second teacher after Aristotle) writes the following about the values: “If this process leads to understand the essence of unity, in that case it will force fathers and children of a certain age to create laws that bring people pleasure who live different lives” [2: p.28-29]. Values are also a necessary means of satisfying human’s thirst for spirituality, culture, enlightenment and moral maturity. Person’s respect for universal, spiritual and moral values will undoubtedly help him/her to be a spiritual, enlightened and civilized person. After all, the role of the value system is outstanding in the deep understanding of human, his/her nature and essence.

Research Methodology. Jalal ad-Din Rumi was one of such great scholars who was able to combine the divine values of Islam with spiritual and moral values in his philosophical teachings. In his works, he touches on many topics related to spiritual values, such as knowledge, repentance, love, norm, justice, truth, honesty, selfishness, faith, honesty, mentorship, fear, and belief. In his philosophical views, the scholar also addresses the issues of morality, ethics, deceit, trustworthiness, love, generosity, upbringing, pride, hypocrisy, respect for parents, family, jealousy, gratitude, envy, loyalty, contentment, good, evil etc. While studying the valuable works of Jalal ad-Din Rumi we also encounter his philosophical reflections on universal values such as peace, friendship, courage, awareness, vigilance, solidarity, religious tolerance and interethnic harmony. In his philosophical views the issues of spiritual and moral values and moral maturity have a leading position. In his views on spiritual values, the Sufi scholar mainly focuses on the issue of love and the heart. According to Rumi, love is the driving force of existence. He points out that the representatives of the flora and fauna also have love, but they love only with their body and skin. Only man is capable of loving with his whole body, mind, imagination and consciousness. According to the Sufi scholar, the union of love and soul is the pillar of the spiritual perfection. If love and soul are described as the constituents of love, then this spiritual unity creates infinite greatness. He also claims that the human heart is the house of Allah, and the purer this house is, the brighter is the light, knowledge and wisdom of Allah. Farid ud-Din Attar in his book *Ilāhī-Nāma* (The Book of Divine) describes the concept of love in the following way: “O offspring! Learn how to love from an ant. Learn to see from the blind, to be heroic from the weak. Don’t look down on the ant, because it also has a revolution of love in its heart” [10: p.38].

Jalal ad-Din Rumi in his philosophical teachings also focuses on the notions of reasoning and love. The Sufi scholar explains his hepatic theories in the example of the

category of truth. According to him, the truth is studied in two ways. The first is through the rational and irrational knowledge of man, and the second is through the understanding of the *Haqq* in intuitive knowledge and the explanation of the attainment of Allah's appearance. The second way is more important to know Allah, and the idea of dominance of love over knowledge is considered a leading principle in the philosophical views of the scholar. Karl Ernst in his book "Sufism" states that the widespread glorification of the concepts of love and freedom in the miraculous aesthetics of Rumi's works has led to his recognition as a 'universal poet' over other Persian poets [9: p.92]. The further coming sayings of Jalal ad-Din Rumi full of profound wisdom have always called all mankind for spiritual maturity and goodness and have never lost their power over the centuries: "There are so many demons in the form of human beings that it is not good to give them a hand without knowing them deeply", "Love and mercy are human like features, but anger and greed are animal ones", "If your heart is open, circumambulate the Ka'bah of soul. The true meaning of the Ka'bah, which you think is made of the dust, is the soul" etc.

Analysis And Results. In philosophical views of Jalal ad-Din Rumi the theories about the categories of ontology, epistemology, sociology, and ethics have dominating position. The important epistemological points of Rumi's works on moral values are also directly related to moral and ethical problems. In his moral values the Sufi also addresses the issues of striving for and possessing high spiritual values and positive qualities. He strongly condemns the immoral qualities of man, emphasizing the need to develop more moral qualities. Following the ancient , Rumi says that one should start the struggle for goodness from himself/herself, only then his/her words come true and these actions will surely be appreciated by the members of the society [1: p.85]. According to his view, evil should exist in this world. Sometimes necessity requires realizing that there is clean water and urine in the world. According to Aristotle, "Virtually, any wrongdoing and unfair stems arise from cultural perversion and immorality. Sometimes even the most insignificant little things can cause the biggest crime if they are viewed from the point of view of morality" [5: p.254]. In relation to this idea Pythagoras says, "People! First of all, try to have good morals, because morality is the basis of the law". The ancient Chinese philosopher Xun Ji claims that "Babies cry the same everywhere. When they grow up, they do different things. This is the consequence of upbringing". Alimat ul-Banat emphasises: "Children are a precious gift in the hands of their parents. Therefore, it is necessary to bring them up nicely, teach them good manners and explain good habits. It is possible to turn a child into gold and soil by upbringing him/her" [3: p.18].

We all know that the first verse of the Qur'an was the ayat "Iqra!" that is, "Read!" Allah's first divine address to the Prophet Muhammad was "Read!" It is known that three books by Jalal ad-Din Rumi have been translated and presented to the Uzbek readers. They are "Maṭnawīye Ma'nawī", "Majāles-e Sab'a" and "In It What's In It". It is noteworthy that the preface of all Mawlana's works begins with a call for enlightenment and acquisition of knowledge. The work "Maṭnawīye Ma'nawī" begins with the verses "*Listen, to the ney*" and the address "*Listen ...*" is in line with the verse of the first interpretation of the Qur'an. In the preface of the first session of "Majāles-e Sab'a" the scholar writes the following words: "It is Allah who brings success to

one's work, supports the development, improves his/her life conditions, and removes the veil of doubt from his/her heart so that he/she may see His greatness. It is Allah who leaves one to his/her own, exiles him/her to misguidance and ignorance, deprives him/her of the blessings of his/her life, nullifies all his/her deeds, and forbids the bestowal of His grace" [6: p.16]. It is well-known that the success of a person depends on his/her knowledge and development as a result of planning his/her work based on his/her intellect and knowledge, while ignorance causes him/her to go astray, go on through the unclean paths, and feel grief for not being able to continue his/her work well. It would be right to draw such a conclusion from the above-mentioned wisdom of Mawlana. Indeed, the ayat 25 of Surah al-An'am of the Qur'an states: "And among them are those who listen to you, but We have placed over their hearts coverings, lest they understand it, and in their ears deafness. And if they should see every sign, they will not believe in it. Even when they come to you arguing with you, those who disbelieve say, "This is not but legends of the former peoples" [11: p.85]. Rumi's masterpiece "In It What's In It" begins with the commentary on the hadith: "The Prophet (peace and blessings of Allah be upon him) said: The worst of the scholars is that who visit the emirs, and the best of the emirs is that who visit the scholars" [7: p.13]. The commentary emphasises that scientists should be worthy of their level and should stay away from flattery, while adhering to the knowledge they teach to others. Thus, from the examples given above we can understand that from the very first lines of his works, Jalal ad-Din Rumi began with the commentaries on the verses of the Qur'an and the hadiths concerning the knowledge and acquisition of knowledge by people. This idea serves as an important factor in our understanding of the role of science in human development and in explaining it to the younger generation, in studying and researching the scientific heritage of Jalal ad-Din Rumi.

Conclusion/Recommendations. In conclusion, it should be noted that the philosophical views of Jalal ad-Din Rumi on spiritual, moral and universal values through centuries have been serving as an important basis for thinking about humanity, raising the spirit of respect for our national values. This is one of the main principles that lead to the rise of Mawlana's world fame and recognition as a "poet of humanity". The great scholar says: "The darkness and night of this world will pass. What remains in it is the light of the word. All the prophets have died, but the light of their words is still alive"[8: 189].

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UDC: 1.13.17

THE ISSUES OF FAMILY STABILITY IN THE SOCIAL VIEWS OF JALAL AD-DIN RUMI

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Annotasiya: Ma'lumki, oila jamiyat ma'naviy taraqqiyotining asosiy omillaridan biri hisoblanadi. Mutafakkirning oila farovonligi, oiladagi tenglik va islom dinida xotin-qizlarning haq-huquqlarini himoya qilishga oid qarashlariga ham ushbu maqolada atroflicha to'xtalib o'tilgan. Bu borada Jaloliddin Rumiyning jahon miqyosida e'tirof etilgan yoshlar tarbiyasiga oid sog'lom e'tiqod, yuksak ma'naviyat, irfoniy tafakkur va komil insonni tarbiyalash kabi gumanizm, al'truizmga doir g'oyalarining mazmun-mohiyatini bugungi kun nuqtai nazaridan ilmiy-nazariy tahlil etish muhim ahamiyat kasb etadi.

Kalit so'zlar: oila, jamiyat, davlat, murosa, ijtimoiy sherikchilik, farzand, tarbiya, axloq, baxt.

Аннотация: Известно, что семья - один из главных факторов духовного развития общества. Взгляды мыслителя на благополучие семьи, равенство в семье и защиту прав женщин в исламе также подробно обсуждаются в этой статье. В связи с этим важно научно-теоретически проанализировать суть признанных во всем мире идей Джалалиддина Руми о гуманизме, альтруизме, такие как разумные убеждения, высокая духовность, мистическое мышление и воспитание здравомыслящего человека.

Ключевые слова: семья, общество, государство, компромисс, социальное партнерство, ребенок, воспитание, нравственность, счастье.

Abstract: It is known that the family is one of the main factors in the spiritual development of society. In this chapter we will discuss the views of the thinker on the welfare of the family, equality in the family and the protection of women's rights in Islam as well. In this regard, it is important to scientifically and theoretically analyze the essence of Jalal ad-Din Rumi's worldwide ideas on humanism and altruism including healthy beliefs, high spirituality, mystical thinking and upbringing of a perfect person.

Keywords: family, society, state, compromise, social partnership, child, upbringing, morality, happiness.

Introduction. One of the long-standing problems and the main topics of debate have been setting up one's own home, the regulation of family relations, the prevention of divorce and the systematization of views on increasing the importance of the family in raising children physically and spiritually healthy. Today we live in the 21st century,



in the age of technology and under the severe crises of globalization. In the East, the family has long been considered sacred and important, and many didactic sources also address family issues. Ancient philosophers, Eastern thinkers, Central Asian scholars, and Western theorists also developed their own concepts concerning family issues. Jalal ad-Din Rumi was one of the great scholars who had his concept of family. Although the scientific heritage of the Sufi scholar has passed over the centuries, it still occupies a worthy place in the series of masterpieces of the world, which encourage humanity to spiritual maturity and help to understand their identity and originality. In his philosophical and ethical views, Mawlana also focuses on the issues of family stability, and in his views, the scientist puts forward the theory that the strength and well-being of families, which are an important factor in the spiritual life of society, directly depend on social and economic equality between the sides. The scholar considers the economic difficulties that occur in all families not as a demerit, but as an exam of Allah to check their patience.

Literature Review. The development and sustainability of society's progress depends on the family, as the family is directly an important link in society. The coexistence of the husband and wife, the high level of the spiritual environment in the family are considered important factors in the development of the socio-spiritual life of society.

The Greek philosopher Aristotle says the following about the role of the family in the development of social and spiritual life of any society: "The presence of a large number of good (*saleh* – righteous, virtuous, well-behavioral, sincere, brave, hardworking, strong, noble etc.) children in the family helps to strengthen the state because the presence of many well-educated (mentally, spiritually) and physically beautiful, tall, strong, energetic young men in the country makes the state strong and enhances its prestige. It is a blessing for both the state and some heads of families to have virtuous boys and girls. For girls, being physically beautiful, kind, spiritually humble, hardworking and noble are the best qualities. It is a great happiness to everyone and every state to have such wonderful boys and girls and every person should strive for it" [2: p.240]. Farid al-Din Attar writes the following: "The fact is that even if the person has thousands of bounds, it will not be a bound of a child, only Allah is free from child care, all servants of Allah live for their children because the child connects the person with the world, and the child's care is part of the world's concerns" [8: p.38].

Research Metodology. Islam, on the other hand, had an orthodox approach to women's rights, their dignity and status. It promoted some feminist views related to women and categorically rejected contrasting ideas such as humiliation and discrimination against women. The Sharia' also stipulates the rights and freedom of women, as well as their rights in property and legal relations. Today, in some Muslim countries, women are prohibited from acquiring secular knowledge and actively participating in public life. However, in reality women are more responsible for the upbringing of their children, so the more educated, skilled, and intelligent a woman is, the more spiritually mature children she will grow up in that family. The Arab woman scholar Alimat ul-Banat writes the following ideas in her famous book "Etiquette of Communication": "Half of the people in the world consist of women. The happiness



of the family also depends on the intelligence and knowledge of women. Women raise well-behaved children. It is inevitable that great people will grow up in the world through their upbringing.

If a woman is educated, she will not have any doubt about her identity and responsibilities. She brings her children up accordingly, treats her husband well, and finally lives according to the canons of Allah. That is why she and her family (her husband and children) will be happy in this world and in the hereafter” [1: p.6]. A woman should be educated in the field of her choice and interest, acquire a profession and make a worthy contribution to the development of her society. Indeed, the Qur’an brings the valid evidence for that idea: “Men will benefit from their labor, and women will benefit from their labor too” [9: 5:32]. It is everyone’s personal right to acquire a profession or craft, to work and earn for an honest living from their job or craft.

In the philosophical views of Jalal ad-Din Rumi, we often come across ideas on the issues of family stability which have educational significance. According to the scholar, the formation and dissolution of a family and both the harmony in the family and the unrest in the family depend primarily on husbands and wives. If the couple lives in mutual union, they cannot be affected by any external factors. The Sufi says, “If you love her, she will love you too. If you take action to get rid of her, she will also secretly make a plan to get rid of you. If you try to break down the wall from one side only, it will not fall down very quickly. As you try to dig it from both sides, the two weapons that are carving on both sides will soon meet with each other. The curtain which appears from the bad look of people e.g., friends and foes, good and the bad of strangers etc. looks like a wall which is between you and your second half” [4: p.60-61.]. Indeed, the strength of the family wall, or, conversely, its erosion, is a process that depends on the couple’s relationship. The scholar writes the following verses about this:

*(Whoever loses a close person, becomes speechless,
Though a million words he can produce.
When a flower goes away, there is no garden left,
There is no also a nightingale and no more epic)* [3: p.8].

Analysis And Results. A wise man shows love to his wife and has mutual understanding with her. The ignorant people, on the other hand, lose their human nature and turn into the animal form through their immoral acts, such as cruelty, violence, humiliation and insult to their wives. Indeed, in the holy hadiths one may find the following: “Afraid of Allah in terms of women because you have received them as a trust from Allah”. In the Avesta (the religious texts of Zoroastrianism) one may find the following lines: “In the first days, the wise lord Ahuramazda ordered to women: O woman! I created you to be faithful and valiant to men and nurture them in your loving embrace so that they may eradicate the root of injustice and impurity from the earth” [6: p.76-77]. A woman is a great gift of the Creator; she is a mother, a wife, a sister and an active member of society. If we go back to the past, we can see that women were always looked down upon and even branded as Shaitan. “During the ignorance period, the polytheists were ashamed of their daughters and buried them alive. Medieval Europe declared that poison, sword and death are better than a woman, for she is the servant of the devil. Some nations burned the dead woman with her dead



body of her husband. Lustful people, who did not recognize the psyche of a woman and were materialistic, had turned the woman into a toy and a pastime for fun” [10: p.18]. Also, in ancient India, women were completely deprived of the right to inherit, and the Sumerians threw women who wanted to divorce into the river, because in Babylon only men were allowed to marry and dissolve marriages. There are some evidences that the ancient Chinese were even ashamed to give names to women.

The scholar adds: “Love built on prejudice is always temporary. It looks like a rotten rope. If you try to hang on to it, it will break up” [5: p.68] and by this he strongly condemns marriages for financial benefit. Rumi always associates love to the sun, which always spreads light to people. A person who has love in his heart does not approve of evil to his wife and those around him. The Sufi scholar emphasizes that as a result of loving and marrying a worthy person, a person can strengthen the bonds of love in the family. Mawlana highly honors the woman and applauds the love for the woman.

Conclusion/Recommendations. “The intertwinement of two strangers in a single table wishing to make up a family, the bond of love and blessing that arises between them, may be an expression of divine power that must be seriously understood. All beings strive for unity according to the divine law” [7: p.190].

These qualities, recognized by Mawlana eight centuries ago, are still considered the most important and necessary factors in the strength and stability of modern families.

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UDK: 94:902(575.1)

FROM THE HISTORY OF THE STUDY OF THE SAKS' MONUMENTS IN THE LOWER SYR DARYA BASINS

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Annotatsiya: Maqolada quyi Sirdaryo havzalarida saklar yodgorliklarining o'rganilishi qarab chiqilgan.

Kalit so'zlar: "Sharqiy Orolbo'yi", Chirikrabot, Jetiosor, Janubiy Tagisken, Shimoliy Tagisken, Uygarak.

Аннотация: В статье исследуется история изучения памятников саков в низовьях Сырдарьи.

Ключевые слова: "Восточное Аральское море", Чирикработа, Жетиосор, Южный Тагискен, Северный Тагискен, Уйгарак.

Annotation: The article examines from the history of the study of the saks' monuments in the lower Syr Darya basins.

Key words: "Eastren Aral Sea", Chirikrabot, Jetiosor, Southern Tagisken, North Tagisken, Uygarak.

Introduction. The fact that In the works of Greco-Roman authors, the Syr Darya – Yaksart is described as the border of nomadic areas, the Khorezm oasis is inhabited by the Apasiak and Sakawarka tribes and the Sogdian leader Spitamen withdrew from Alexander's army to the steppes, was one of the reasons that led to the beginning of archeological investigations in the Syr Darya basin in 1946[13]. Because the history and culture of the Saks was not thoroughly explored.

Literature review. The lower Syr Darya, which joins the Aral Sea from the east, is a large plain. Its width is 400 km and in the meridian line, this plane intersects 200-250 km. It is bordered on the north and northeast by the modern valley of the Syrdarya and on the south by the Kyzyl-kum. These areas are geographically called the "Eastern Aral Sea regions"[9].

The origin of this vast steppe plain is associated with the efforts of the ancient rivers of the Syr Darya, changing the direction of the water at different times and flowing into the Aral Sea. In the plains there are rivers called Inkardarya, Jonidarya, Kuvandarya and Eskidarya, which consist of a system of ancient tributaries of the Syr Darya. They started in the south of what is now the Red Horde[8].

The geographical environment of the Eastern Aral Sea region, warm and humid air, abundance of fresh water have long created favorable conditions for human life. Thus, these factors influenced the economy, lifestyle and material culture of the ancient population of the Lower Syr Darya and played an important role in the development of historical processes.

The ruins of the city and other archeological monuments located in the eastern part of the Aral Sea and in the middle part of the Syrdarya were first described historically and geographically in the late 19th- early 20th centuries[1]. Archaeological



excavations of the Khorezm expedition, which began in 1946, continued until 1992 with breaks. As a result, many monuments of the Neolithic and Bronze Ages, the Early Iron Age and the Antiquity were discovered.

In 300 km southwest of the Red Horde (Janidarya oasis), the ruins of the city Chirikrabort of the Saks were found and examined, which is peculiar to in the 5th-2nd centuries BC. It has an ovoid history and covers an area of more than 50 hectares. Chirikrabort is surrounded by a trench and two rows of defensive walls. The walls are reinforced with rectangular defensive towers and have internal corridors for firing[20].

According to S.P. Tolstov, Chirikrabort was the center of the association of the Apasiak tribes[21]. Simultaneously with this monument, Babishmulla began to be examined. It is located 40 km northeast of Chirikrabort and consists of a rectangular inner fortress (area 1 hectare) and the ruins of a town occupying 2 hectares. S.P. Tolstov wrote that this fortified town should be the center of one of the Apasiak tribes and the residence of the chief of the tribe[14]. 40 burial structures belonging to the Chirikrabort culture, the ruins of mausoleums made of raw bricks were inspected. Most of them have a circular shape, two of them are rectangular in shape. Eighteen of these tombs have been excavated[2].

The owners of the Chirikrabort culture lived a sedentary and semi-sedentary lifestyle. They knew the artificial irrigation system. The settlements are made of mud bricks and are located separately around the castles[17].

A large group of Sak monuments has been identified in the Jetiosor oasis adjacent to the Eskidarya River in the Syrdarya. It is located north of the Inkardarya and Janidarya rivers, southwest of the present-day city of Jusali[18]. Archaeological research was conducted in 1948-1949, 1951 (S.P. Tolstov, Y.A. Rapoport, M.A. Orlova, T.A. Zhdanko) and in 1973-1991, was performed under the direction of L.M. Levina.

The geographical conditions, location and topography of the monuments of Jetiosor were originally determined by S.P. Tolstov. According to the scientist, the Jetiosor district is connected to the Jusali steppe in the north, and in the west this steppe changes and goes to the bottom of the Kuvondarya river and turns into sand dunes. All the identified monuments are associated with the main river of Eskidarya or its tributaries, i.e. all the monuments are located near the river and the banks of the tributaries[11].

The monuments are divided into three main types according to their features and topographic characters, including small castles surrounded by defensive walls, fortified walls with towers and dwellings inside, large fortifications with highly developed fortifications, castles (Oltinosor 2, 3)[12]. These forts of the Saks were discovered to have been built in the middle of the first millennium BC.

Simultaneously with the study of the Chirikrabort and Jetiosor monuments, extensive exploratory archeological work was carried out in the lower Syr Darya region. As a result, in 1959, more than 70 burial mounds belonging to cattle-breeding tribes were found along the banks of the Inkardarya River, 200 km southwest of the city of the Red Horde. They are divided into northern and southern Tagisken groups[16]. Instead of 11 forts in northern Tagisken, remains of mausoleums made of raw bricks of 9th-8th or 10th-8th centuries were excavated. Archaeological excavations



have revealed that the 1960-1961 made under the direction of M.A. Itina. The results of the research are covered in a special article [23].

Burial structures, with advanced building techniques and architectural history, consist of rectangular and ring tombs. As an example, the mausoleum №5a consists of a rectangular structure with sides 18 m and a round section (diameter 14 m) separated by a circular corridor inside. Even larger, inside the 25 m diameter ring mausoleum, there is a rectangular burial structure. A corridor separated the outer and inner parts of all tombs (including №4a, 5v). Remains of columns made of raw bricks and pits for the installation of wooden columns were found carved in the central parts of their burial grounds. In ancient times, the height of the tombs was about 6-8 meters, and in such large structures the tribal leaders and tribal elders of the first nomads were buried[15].

Among the monuments found on the banks of the Inkardarya, the Southern Tagisken and Uygarak tombs, which belong to the first Saks culture of the 7th-5th BC centuries, are distinguished. Between 1961 and 1965, 70 burial mounds were excavated in the ancient Uygarak cemetery[22]. The results of the study were covered in the work of O.A. Vishnevskaya[5].

The height of the Uygarak tomb mounds is 1-2 meters, some of the mounds are much larger and have a diameter of 20-22-27 meters. O.A. Vishnevskaya, who identified the burial customs of the Saks in Uygarak Cemetery, divided the studied ancient tombs into: rectangular pits, the corpses buried in clothes and shoes, the tops of the tombs covered with reeds; the walls are made of wooden huts, hut tombs, corpses are placed on the ground. Also there were found wooden columns mounted in two rows of pits, and tombs with wooden walls. They were covered with sticks and reeds, in which the dead were cremated[3].

Various burial equipment (household items, pottery, weapons, jewelry) were found in the burial mounds of Uygarak[6]. This habit was associated with the notion of the "other world". In the tombs of men and women there are pottery vessels, which are placed near the head or feet of the corpses. Some tombs contain pieces of the meat of sacrificial animals. This is evidenced by the spine, ribs and skulls of sheep found in graves.

Among the burial equipment of men's graves, there are horse harnesses, bullet points, bronze and iron daggers, and thin, sharp stones designed to sharpen them. In the graves of the women there are beads, jewels, bracelets and bronze mirrors, in addition to the items related to household activities in life - quilts and ruffled heads[4].

Research methodology. The article is based on the principles of scientifically recognized historical methods-historical, comparative logical analysis, analysis, sequence, objectivity, aggregation.

Analysis and results. As a result of the archaeological excavations in the Lower Syr Darya region, Saks' monuments unknown to history, were discovered. Archaeological excavations of the Late Bronze Age North Tagisken burial site have also come as a surprise to archaeologists, as there are no monuments of raw brick and intricate architecture in the Eurasian steppe, including the Southern Urals, Central and Northern Kazakhstan, and Western Siberia.

Due to the study of the Chirikrabort and Jetiosor cultures of the Khorezm expedition, it became clear that by the middle of the first millennium BC, the Saks



began to use raw bricks and wattle and daub as building materials. This is evidenced by the ruins of large cities, towers and castles with shooting ranges, which belong to the Jetiosor culture and are surrounded by defensive walls[10]. Although cattle-breeding played an important role in the life of the Lower Syr Darya communities during this period, the majority of the population were not nomads. Archaeological excavations have revealed that the population groups of the lower Syr Darya belong to semi-settled cattle-breeders[7]. This cultural innovation took place in the second stage of the history of the Saks, manifested in the 5th-3rd centuries BC.

Material objects found in the Uyghur burial mounds are of great importance in determining the history and culture of the Sak tribes, which developed shortly before the above-mentioned processes.

Taking into account the information received, S.P. Tolstov highlighted the main features of the culture of the Eastern Aral Sea Saks, the Sak-Massagets and the Scythians and Sarmatians, as well as economic and cultural relations with the ancient cattle breeders of Kazakhstan and Siberia[19].

Conclusion.

1. This important fact was not overlooked during the beginning of archeological research of the culture of the Aral Sea Saks. At the same time, the research plans of the Khorezm archeological expedition are aimed at studying the history of steppe cattle-breeding tribes.

In the southern part of the Lower Syrdarya delta (Inkardarya tributaries) the first Sak settlements and burial mounds (South Tagisken, Uygarak) were identified. It was found that cattle-breeding tribes had a semi-nomadic lifestyle and lived in settlements not surrounded by defensive walls.

2. In the second period, which began in the 5th-4th centuries BC (Chirikrabort and Jetiosor culture) in the Lower Syrdarya basin were built large castles and houses, agriculture played an important role in the economic life of the population.

As a result of many years of research of the Khorezm archeological expedition, the defense structures, architectural features, handicrafts and the ancient artificial irrigation system of the Eastern Aral Sea (Lower Syrdarya) saks of the 5th-3rd centuries BC were studied.

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UDK: 316.3: 338.009

MODERN PHILOSOPHICAL INTERPRETATION OF ABU RAYKHAN BERUNI'S SCIENTIFIC IDEAS

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Annotatsiya. Ushbu maqolada o'rta asr Markaziy Osiyoning buyuk allomasi Abu Rayxon Beruniyning ba'zi bir ilmiy g'oyalarini zamonaviy falsafiy-metodologik talqini yoritilgan.

Kalit so'zlar: Abu Rayxon Beruniy, bilish, o'rta asr, fan, g'oya, ilmiy g'oyalar, simmetriya.

Аннотация. В статье описывается современная философско-методологическая интерпретация некоторых научных идей великого средневекового среднеазиатского ученого Абу Райхана Беруни.

Ключевые слова: Абу Райхан Беруни, знание, средневековье, наука, идея, научные идеи, симметрия.

Annotation. This article describes the modern philosophical and methodological interpretation of some scientific ideas of the great medieval Central Asian scholar Abu Rayhan Beruni.

Key words: Abu Rayhan Beruni, knowledge, medieval, science, idea, scientific ideas, symmetry.

Introduction. It is known that in the history of Central Asia there were many great people who embodied political wisdom, spiritual courage, religious worldview and encyclopedic knowledge. In particular, Al-Kharizmi, Beruni, Ibn Sino, Mirzo Ulugbek, Imam Bukhari, Imam Termezi, Khoja Bahovuddin Naqshband and many other great ancestors have made a great contribution to the development of our national culture, have become the national pride of our people. Their names, their great contributions to the development of world civilization, are now known all over the world. That is why today we need to study the spiritual riches left to us by our great thinkers.

Since the 19th century, interest in Beruni's legacy has grown in Europe and Asia. His works have been translated into Latin, French, Italian, German, English, Persian and Turkish. Books and translations of European scholars dedicated to Beruni's works have been published.

Literature review and methodology. After the publication in London in 1889 of an English translation of Abu Rayhan Beruni's "Al-asar al-baqiya an al-kurun al-khaliya" by E.Zahai, interest in the scholar's work spread throughout the world. Also, the collective monograph "Abu Rayhon Beruni" by B.A.Rosenfeld, M.Rojanskaya, Z.Sokolovskaya was published. It covers Beruni's multifaceted work and his achievements in the field of mathematics.

Great attention is paid to Beruni's work in his native Uzbekistan. H.M.Abdullaev, I.M.Muminov, V.Y.Zohidov, Y.G.Gulomov, U.Karimov, S.A.Bulgakov have created a number of pamphlets and works about Beruni's activity. A number of international



scientific conferences dedicated to him have been held in Tashkent. For example, in 1973, academician I.M.Muminov held events in Uzbekistan on the occasion of the 1000th anniversary of the birth of Abu Rayhon Beruni.

Since June 2009, the pavilion of Persian scholars, located in the Memorial Square of the Vienna International Center, has housed four famous scholars: Avicenna, Beruni, Zakiri Razi (Reyz and Omar Khayyam). The Research Institute of Oriental Studies in Tashkent is named after Abu Rayhon Beruni. Beruni metro station in Tashkent. There are statues of Beruni in Tashkent and Khorezm. The Beruni State Prize in Science has been established.

At the same time, the Academy of Sciences of Uzbekistan has published a large number of selected works in Uzbek and Russian, including Beruni's major works, such as "Ancient Monuments", "India", "Masud's Law", "Geodesy", "Saidona".

Analysis and results. The issue of scientific and philosophical study of Beruni's work has been studied by many historians, culturologists and specialists in the history of science. His views and creations have been studied and researched not only by local but also by foreign scholars.

At the same time, E. Videman provided important information on Beruni's views on the natural sciences and his great discoveries in his scientific articles. For this reason, he was also recognized as a Beruni scholar. Indeed, in the second half of the twentieth century, the science of Beruni became widespread. In particular, A.Jaylani's articles on geocentric teachings of Abu Rayhan Beruni, S.Nasr's questions and answers of Beruni and Ibn Sino, A.Sharma Beruni's teachings on Indian samsara were published.

Academician I. Muminov praised the method of scientific knowledge of the scientist, emphasizing the methods of observation, experiment, analysis, synthesis, comparative analysis, data collection and verification, generalization. In Uzbekistan, Professor R.Nosirov made a special study and analysis of the incomparable importance of experience and observation in the work of the scientist, while Beruni scholar A.Sharipov in his scientific work paid special attention to Beruni's correspondence with Ibn Sino. At the same time, the scientist revealed an unexplored new aspect of Beruni's work.

Philosopher L.Yuldasheva made a comparative analysis of Beruni's interpretation of the problems of Indian philosophy in the historical-philosophical analysis, the study of Beruni's natural-scientific and socio-philosophical heritage by Western scholars as a whole.

Historical, critical, systematic methods were used in the preparation of the article.

Discussion. The concept of the period of rapid development of Central Asian culture during the IX-XI centuries includes science, social thought and literature. During this period, in Central Asia, such thinkers and encyclopedic scholars as Al-Kharizmi, Al-Fargani, Abu Rayhan Beruni, Abu Ali Ibn Sino and Abu Nasr Farobi, as a result of their work in various fields of science, created a variety of philosophical, natural -promoted scientific, socio-economic, political-legal and spiritual-religious ideas. For this reason, the results of research conducted by Central Asian thinkers in all fields of science are widely used in modern science and technology.



It should be noted that the promotion of natural, scientific and social ideas in Central Asia is also reflected in the work of Abu Rayhan Beruni. "Abu Rayhan Beruni is a great scientist and brilliant philosopher who amazes with the breadth of his knowledge and the evidence of his ideas. It is devoted to the current issues of natural science, philosophy, history and philology of that period "[10, 26]. Indeed, when I look at Beruni's work, we can find that there is a comprehensive mindset in the study of being. While Beruni was creating in various fields of science, he was far ahead of his time with his advanced ideas. His natural-scientific ideas were confirmed centuries later, and his views form the foundation of modern science.

It should also be noted that some of Beruni's scientific ideas were not taken into account in his time due to the limited philosophical approaches of the time, but over the centuries scientists have understood their essence and put them into practice.

In the Middle Ages, the development of mathematics and astronomy in Islamic culture was stimulated by vital needs and practical needs. Such a successful development of science has taken place on the basis of qualitatively new scientific approaches to world civilization, enriched with many scientific ideas and discoveries [5, 75].

In contrast to the Greek ideas and approaches, research has been conducted on the basis of new approaches, new concepts in geometry, astronomy, arithmetic, music, medicine and the doctrine of harmony.

It is known that at that time in the works of Central Asian thinkers great importance was attached to the concept of harmony. Emphasizing that the concept of harmony is universal, they emphasized that it is not only related to the Universe but also to the private sciences. Harmony has been described as the heart of man, an essential component of his activity. At the same time, disharmony is a necessary element of the integrity of harmony. Harmony is formed through disharmony. Problems such as order and disorder, the transition from disorder to order are among the current problems of modern science.

Thoughts on the importance of experience in the process of learning in the work of the scientist who created during this period. For example, according to al-Beruni, "I have doubts: its elimination depends on experience and re-testing, and even if there is unity among the narrators, its truth is not confirmed by experience" [4, 247]. Hence, practice is a method of acquiring knowledge through experience and approving its reality, a way of describing knowledge.

"Man," Beruni writes, "can think about any field of science when he is engaged in practice and has achieved precision in his research. At the same time, he must be a philosopher "[3, 90]. It is impossible not to agree with these views, because Beruni points out only one feature that is important for the development of science - development emphasizes that science should be based on philosophy, with philosophical methodology.

The existence of symmetry in living nature was also known in Ancient Greece. In the ninth century, Beruni scientifically proved that living nature could be represented in geometric shapes. At the same time he was able to show ornaments in morphology, crystals, beehives, snowflakes. Beruni points out that "the number of leaves that form mirrors at the edges often conforms to the rules of geometry when the flower opens. In



many cases they are equivalent to chords, determined by a geometric method rather than on the basis of conical works. It is impossible to find 7 or 9 leaves in a flower that can be inserted into a right triangular circle by geometric methods. Conversely, the number of leaves in a flower will be 3, 4, 5 or 18. This condition is more common, but can sometimes be found in flower species with 7 or 9 leaves. Flowers with such leaves can also be found in the above species "[2, 329]. Beruni discovered new forms of symmetry.

It is the idea of the existence of geometry in living nature and its product in philosophical observation in symmetrical configurations. In the twentieth century, according to Vernadsky, the symmetry that exists in living nature has not been well studied, and it is important to study this problem.

Modern science has confirmed Beruni's scientific views. Indeed, rotating symmetry has been confirmed to exist in the plant world, in simple animal organisms, and in some marine animals.

In the 19th century, some scientific works on symmetry in the plant and animal world were published. The symmetry found in the Beruni plant world does not exist in non-native nature. What is the reason why symmetry is necessary for survival and why does it appear. Living organisms have formed their own symmetry in the process of evolution.

"The fact that the organisms of the plant kingdom also have symmetry is related to their sunlight, natural (physical) endurance, and non-lying (the force of gravity of the whole universe)" [9, 192]. It is an adaptation to a specific external environment, a struggle for life.

In 1024, Beruni completed his work on astronomical and geographical problems, "Determining the final boundaries of places to check the distance between dwellings" - "Geodesy". In this work, for the first time in the world, geodesy distinguished between independent complex problems and geodetic astronomy [7, 15]. Indeed, Beruni advanced scientific ideas in mineralogy, geodesy, astronomy, and many other fields. For this reason, "the combination of astronomer-mathematical and historical-ethnographic needs allowed Beruni to create a work "Chronometry" [6, 353-354].

It is well known that Beruni points out that the Earth is constantly changing, that man can only observe the results of ancient geological processes. According to him, the formation of the Earth covers huge geological periods. However, Beruni put forward a higher idea than this, and this idea remained a mystery to his contemporaries and for a long time after that. This was the idea of geotectonic change of the Earth [8, 321]. Of course, Beruni's idea is widely studied in modern science, and geotectonic processes are studied in connection with the interaction of layers and crusts of the Earth's lithosphere, their seismicity. Also, the idea of inequality in the motion of the Sun and the planets moving around it, and the first research on this subject, belongs to Beruni.

Conclusion. In general, the ideas put forward by Central Asian thinkers have contributed to the development of world civilization and have a direct or indirect place in the achievements of modern science. That is why the natural-scientific and socio-political ideas put forward by Central Asian thinkers are essentially important for the development of modern society and the further development of science, and these ideas



are used directly or indirectly by humanity. In particular, the ideas of differentiation and integration (interdisciplinary) can be confirmed in Beruni's work [10]. This is why the repeated study and analysis of the works of great scholars is of great importance for the process of cognition.

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UDK: 94(575.1)

CONCEPTUAL FUNDAMENTALS OF INNOVATIVE DEVELOPMENT OF UZBEKISTAN

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Annotatsiya. Ushbu maqolada Respublikamizni innovatsion rivojlanishining kontseptual, nazariy-amaliy asoslari “Harakatlar strategiyasi” bo’yicha amalga oshirilayotgan islohotlarni tahlil qilish orqali yoritib berilgan.

Kalit so’zlar: rivojlanish, islohot, muloqot, ta’lim, ilm-fan, innovatsiya, inson kapitali, raqamli iqtisodiyot, Harakatlar strategiyasi.

Аннотация. В статье описаны концептуальные, теоретические и практические основы инновационного развития республики на основе анализа проводимых реформ в рамках «Стратегии действий».

Ключевые слова: развитие, реформа, коммуникация, образование, наука, инновации, человеческий капитал, цифровая экономика, Стратегия действий.



Annotation. This article describes the conceptual, theoretical and practical basis of innovative development of the Republic through the analysis of ongoing reforms under the "Strategy of Action".

Key words: development, reform, communication, education, science, innovation, human capital, digital economy, Action Strateg.

Introduction. Today's complex and non-linear, unstable and dangerous processes, as well as pandemic conditions, certainly affect the development of all countries. That is why every country is striving to make its social development sustainable. Special attention is paid to human capital, digital economy, innovation, digitization, new innovative technologies. In particular, reforms are being carried out in our country based on the introduction and rapid development of modern innovative ideas, developments and technologies in all spheres of life in order to make rapid and high-quality progress towards joining the ranks of developed countries.

Research methodology. It is well known that the scientific literature emphasizes evolutionary and revolutionary views of development. However, in recent years, as a result of globalization and the penetration and widespread use of information technology in all areas, the development of society has moved to a new stage, that is, to an innovative direction.

Most developed and developing countries have chosen the path of innovative development in order to advance and develop the country. In particular, the Republic of Uzbekistan has embarked on a path of innovative development. Indeed, our country has chosen the path of innovative development. The innovative development of the country is associated with overcoming the resistance of antiquity. This process is a reflection of the evolution of society, the evolution of human cognitive capabilities, the evolution of human intellect.

The methods of comparative analysis, synergetics, interdisciplinary approach, systematic approach were used in the preparation of the article.

Literature review. It can be said that development is "a kind of movement and change in nature and society, associated with the transition from one state to another, from the old to the new" [8]. Hence, development is a irreversible, directed, and regular change of material and ideal objects, a new qualitative and quantitative state based on the emergence, change, or disappearance of the relationship of element and objects. That is, development in philosophy is a general principle of explaining the change of matter and consciousness, their universal property, nature, society, and the history of knowledge.

In our country, there is research on economic, political, philosophical, historical, legal issues of social and innovative development, as well as directions of development in the reforms within the Action Strategy. In particular, M.N.Abdullaeva, G.T.Mahmudova, I.Saifnazarov, N.A.Nazarov, A.Mukhtorov Works and scientific researches of such scientists as, F.H.Yuldasheva, J.S.Ramatov, G.G.Gaffarova, G.O.Jalolova, M.K.Niyazimbetov can be noted. In particular, the monograph "Conceptual and philosophical methodology for the analysis and implementation of the reform process in Uzbekistan" describes the Action Strategy as a complex system and its reforms are based on a systematic approach [9].



G.G.Gaffarova's research analyzes that human capital, digitalization, digital economy are important factors in the innovative development of the republic [10-14].

Analysis and results. The theoretical and methodological basis of the consistent innovative development of Uzbekistan is reflected in the "Strategy of Action". Social, economic and political reforms have expanded the scope of human activity, i.e. the area of opportunities, the areas of human activity associated with it have increased. In particular, democratic reforms continue to adapt to changing conditions, changes in human and social thinking. Therefore, "the idea that the reform of thinking is urgent is in turn a vital necessity for humanity to carry out deep, serious reforms in our education system" [7, P.28]. Of course, changing the way a person thinks, providing him with new ideas is a problem that everyone faces throughout life. Especially today, when new ideas enter all spheres of human activity (politics, government, business, economy, education), the socio-economic changes taking place in our country are trying to improve the quality of life and take a worthy place in the world community.

The reforms being carried out in our country are being carried out in the context of an innovative growth model. At the same time, the reforms being carried out in the field of education, modernization, active entrepreneurship, active investment, tourism development, innovative ideas and technologies, roadmaps in the digital economy are comprehensive, and the tasks are set in accordance with the period. At the same time, today the implementation of the Action Strategy for 2017-2021 also includes five priorities for the development of the country. That is, improving the construction of the state and society; ensuring the rule of law and further reform of the judicial system; further development and liberalization of the economy; development of the social sphere; ensuring security, interethnic harmony and religious tolerance, pursuing a foreign policy in a well-thought-out, mutually beneficial and practical spirit [1].

The algorithm of the strategy of action is aimed at communicating with the people, with other countries in the process of protecting human interests. Therefore, the interaction between man, the state, society, further strengthens the existing connections and influences between these elements. Of course, "dialogue, discourse, various forms of communication between leaders and the people are the most important aspect of the implementation of the Concept" [4, p.87]. For this reason, the dialogue between the state and the people opens up new prospects for development, as well as allows to solve development problems based on laws and decrees.

The direction of the action strategy plans is multi-vector and each is multifunctional. Today, the innovative development carried out in our country within the framework of the "Action strategy" is reflected in a number of qualitative changes. That is, "structural and functional reforms have become a priority in all spheres of society" [5,p.5]. It is well known that "structure reflects the interrelationships and interactions between the elements of a system. Therefore, a change in the structure leads to a change in society "[6, p.25]. Indeed, in a society that has entered such a period of change, the introduction of innovative technologies, unconventional thinking and foresight, the use of the latest production methods and tools are seen at the level of social need. That is, "if we start building our great future today, we must start it on the basis of innovative ideas, innovative approach" [3, p.20].



It can be seen that in the development of mankind, innovative ideas have the power to change the scientific, social direction. They (innovative ideas) are formed in such areas of human science as scientific, social, political, economic. Innovative ideas in the field of science allow to organize new scientific directions, simplify production processes and create opportunities for the opening of new fields. In this regard, 2019 has been named the “Year of active entrepreneurship, support of innovative ideas and technologies” in our country. We can see this in the innovative changes in the field of education in our country. In particular, the strategy of action and the decisions taken in recent years on education form the basis of the ongoing reforms in the field of education in our country.

At present, the implementation of innovative ideas is not based on a single specialty, but in the field of interdisciplinary integration. Science is the source of innovative ideas. On the one hand, science transforms them into theoretical knowledge by giving them a rational analysis. On the other hand, it ensures the application (translation) of these innovations, knowledge in other areas of human activity.

Innovative ideas in the field of education are also used to introduce new pedagogical methods in the field of education. Innovative ideas in the field of education are widely used in our country. Education is directly related to the culture in a society, culture influences its formation and change. The formation of a high culture in the citizens of the society is connected with education and upbringing. Therefore, the concept of education and upbringing adopted in our country is a whole, that is, the paradigm of education in our country, the system of "education and upbringing" plays a guiding, regulating role in the process of educating the younger generation. This paradigm opens up great opportunities to teach young people patriotism, national traditions, values, skills.

In today's extremely complex world, innovative activity must also be flexible, adaptable, so that man can adequately adapt to a rapidly changing situation. Innovative activity is carried out on the basis of human thinking, his creativity, which is constantly updated and constantly increasing its effectiveness. The realization of a creative idea is an innovation. Of course, “innovation is the creation of previously non-existent objects, structures, values and methods (technologies) of activity, the expression of emerging innovations in signs, images and symbols. At the same time, it is a process of application to all spheres of society and human life through social assimilation and distribution ”[5,p.4]. So, innovation means that the mechanism of self-development is understood and the scope of knowing the world is expanded and enriched.

Also, the strategy of innovative development of the country for 2019-2021 was adopted. According to him, the rapid introduction of modern innovative technologies in the economy, social and other spheres with the widespread use of scientific and technical achievements is an important condition for the rapid development of our country [2]. Indeed, the rapid development of all spheres of society and state life requires the implementation of reforms based on modern innovative ideas, developments and technologies that will ensure rapid and quality progress of our country on the path to becoming a leader of world civilization.

Conclusion. Implementation of the “Action strategy” is new for the Republic of Uzbekistan's efforts to reform and modernize the country, build a democratic state



based on the rule of law, a strong civil society, the rule of law, security and law and order, inviolability of state borders, interethnic harmony and religious tolerance. gives strength. Therefore, new perspectives and approaches to the implementation of the ideas of the “Action strategy” are being formed in the socio-economic environment. So, as we move on the path of innovative development of our republic, we need to develop human capital.

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