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NEW INFORMATION TECHNOLOGIES IN EDUCATION

Erkinova M.T. 6

NETSPEAK IN THE KARAKALPAK LANGUAGE

Kdirbaeva G.Q. , Orazgalieva A.M. 8

NEW SIGNALLING TECHNOLOGY FOR RAILWAY TRANSPORT

Astanaliev E.T. 12

**INSTAGRAM SNS AS AN INNOVATIVE MEANS IN ADVANCING
FOREIGN LANGUAGE SKILLS OF LANGUAGE LEARNERS**

Azizov S. U., 16

FORMATION OF LANDSCAPE DESIGN IN CHINA

Kasimov O. S. 20

DYNAMICS OF EXCITONS IN BRANCHED CONJUGATED POLYMERS

Yusupova J. R., Matyokubovb H.Sh., Sabirovc K. K., Matrasulova D.U. 24

ISSUES OF REORGANIZATION OF RURAL AREAS

Normatova D.I., Midinov E.O. 26

**IN UZBEKISTAN, IN THE WORLD OF ARCHITECTURE
AND ARCHITECTURE, IN THE WORLD OF MODERN ART**

Abduraximov L. X., Normurotov B. M., Pardayeva Z., Gafforova Sh. T. 28

**РАЗРАБОТКА ФУНКЦИОНАЛЬНОЙ СХЕМЫ РАДИОСИСТЕМЫ
ПЕРЕДАЧИ ЦИФРОВОЙ ИНФОРМАЦИИ**

Хамраев Ж.Х. 31

WHAT IS A MECHANICAL ENGINEER?

Toyirov O. 38

BENEFITS OF E- LEARNING

Saydullayeva M., Alangova A. 41

**МЕТОДЫ ЧИСЛЕННЫХ РЕШЕНИЙ ИНТЕГРАЛЬНЫХ УРАВНЕНИЙ В
СРЕДЕ MATLAB**

Рахимов К.О., Назаров Х. 44

**SOCIAL NETWORKING IN FL TEACHING AS INFORMAL ONLINE
INTERACTIONS**

Bekmurova G. Sh. 48

**SPIRITUAL AND MORAL EDUCATION IN THE EDUCATION
AT THE TECHNICAL UNIVERSITY**

Murodullayeva M., Alikulova F., Nematillayev J., Tursunpulatov M. 50

THE SPECIFICS OF UZBEK ONOMASTICS

Allanazarova S. X., Saydullayev M. Z. 53

**ВЫЧИСЛИТЕЛЬНЫЙ ЭКСПЕРИМЕНТ ДЛЯ ИССЛЕДОВАНИЯ
ВОЗБУЖДЕНИЯ СУБГАРМОНИЧЕСКИХ КОЛЕБАНИЙ
В ТРЕХФАЗНЫХ ЭЛЕКТРОФЕРРОМАГНИТНЫХ ЦЕПЯХ**

Абдуллаева Р. 56

**PHYSICAL CHAEACTERISTICS OF SALINE SOILS ON AUTOMOBILE
ROADS**

Kayumov A. D., Zafarov O. Z., Saidbaxromova N. D. 59

**ВЛИЯНИЯ КОНЦЕНТРАЦИИ ДИСПЕРСНЫХ ЧАСТИЦ ПРИ
ДИФфуЗИОННОМ ГОРЕНИИ ТУРБУЛЕНТНЫХ ТВЁРДЫХ СТРУЙ**

Мирзоев А.А., Буриев Э.С. , Назаров Ш.Э. 63

SMART-ТЕХНОЛОГИИ В ОБРАЗОВАНИИ

Бобомухамедова Ш. А. 67

NEW INFORMATION TECHNOLOGIES IN EDUCATION

Erkinova M.T.

Student TUIT Mohammed al-Kharizmi

Annotation: *This article discusses teaching using information technology and distance learning.*

Key words: Teaching, education, computer technology, information technology, distance learning

The modern period of the development of society is characterized by a strong influence on it of computer technologies that penetrate into all spheres of human activity, ensure the dissemination of information flows in society, forming a global information space. An integral and important part of these processes is the computerization of education. Over the past 5 years, the number of children who know how to use a computer has increased about 10 times. As most researchers note, these trends will accelerate regardless of schooling. However, as revealed in many studies, children are familiar mainly with gaming computer programs, using computer equipment for entertainment. In this case, the cognitive, in particular educational, motives for working with a computer are approximately in the twentieth place. Thus, the computer is not sufficiently used for solving educational and learning tasks.

One of the reasons for this situation is related to the fact that computer technology at school has not yet found its proper application. But in schools where children are taught on the computer, not all of its capabilities are fully realized. Most primary school teachers are not even famil-

iar with computer technology and have no idea about how to use them in school. Computer lessons, in most cases, are taught by computer science teachers, because of the specifics of their training, they have poorly represented conditions that must be observed when using computer technologies when teaching specific subjects.

The problem of the widespread use of computer technology in the field of education in the last decade has aroused an increased interest in the national pedagogical science.

Information technology in education can be in several forms. Each is necessary for full-fledged training, as well as for this process to be comfortable and enjoyable for all parties.

First of all, information technology has greatly helped teachers. This is a great way to get all the necessary information, as well as correctly compile relevant and modern lessons.

Teaching systems are constantly changing, and there is a huge amount of discovery, but with the help of the Internet it is easy to always be aware of and make your lessons as useful as possible for modern people. It is also impossible not to note the form of teaching itself.

Information technologies in education allow you to find not only texts, but also videos, slides, and much more on this topic. Now the training is interesting and fun, because it is not only in the form of stories, but also with the help of computers and televisions, as well as projectors, information is provided in the most convenient format for children. Many even started to go to school and other educational institutions with pleasure, although earlier it was a great difficulty.

It is impossible not to pay attention to the other side, to the students. It can be very young, children or even adults, the benefit of the newest discoveries does not depend on it.

First of all, the technologies allowed to receive information in any quantity, and not be limited to the words of the teacher and the textbook. It has become an indispensable opportunity to use the network. Also, students had the opportunity to show their creative abilities thanks to a variety of presentations and so on.

We should also talk separately about the fact that new information technologies in education allowed the emergence of completely new projects:

Self-study. Now almost any area can be mastered by yourself thanks to the huge amount of open information. And for this you do not need to go to the archives and libraries, just enough to have a personal computer with Internet access.

Distance learning. Higher education is certainly very important, but there are people who live too far from institutions, or they do not have enough time. Remotely perform tasks, projects and take

sessions – this is a great opportunity to replace the classical form of education.

Communication with the teacher. This applies to tutors who can now teach via Skype, as well as the opportunity to learn languages with them or to get a new profession that is not too complicated.

Information technology in education gives a huge number of opportunities. The Expocenter can present only a small number of them, but already now one can notice the tendency that such innovations are becoming more and more deeply involved in this process.

Video conferencing, tutorials, a huge amount of useful communication and materials make it possible to make modern education special.

Life is now very much accelerated its pace, which is why it is worth paying attention to the fact that education fit in the shortest possible time and with minimal effort, but the quality and volume of knowledge should only increase.

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NETSPEAK IN THE KARAKALPAK LANGUAGE

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Keywords: Netspeak, Internet, virtual community, conversation, chat groups, acronym, abbreviation, modern linguistics.

Annotation: *The article deals with the language on the Internet, the effect of the Internet on language and some features of netspeak in the Karakalpak language and describes the news in the field of the development and usage of the internet language, mainly abbreviations.*

Аннотация: *В статье рассматриваются языком интернета, влияние интернета на язык, особенности Netspeak в каракалпакском языке и описывает новости в области разработки и использования интернет-языка в основном аббревиатуры.*

The language of Internet users is plainly in a state of transition.

As Patricia Wallace puts it in her discussion of the false impressions Net participants gain about each other during encounters: "On the Internet we are struggling with a very odd set of tools and pushing them as hard as we can and all of us are learning some painful and awkward lessons about impression formation online". And she adds: "I look forward to the time when the kinds of "interaction rituals" that Goffman described will stabilize on the net and the business of forming impressions will be more predictable, reliable, and familiar, and much less prone to those hazardous misperceptions[1]. The need for greater predictability, reliability, and familiarity is something which affects all Internet situations and the language which is found there and we consider that one of negative aspects of internet mediated communication is that there is no way of controlling that Internet users have the sufficient skills in grammar

and spelling for it to be a good thing that millions of people read what they write.

Moreover, bloggers are viewed as trend setters and role models in today's society, giving them huge influence on the generation that is growing up today. They can create words, phrases and "publish" them online without any problem and since the most popular bloggers write in English and have as many readers as they do, these words can spread and catch on quickly and making blogging is contributing to a possible dummifying-down of the language, since no grammar or spelling corrections are needed.

Everyone is aware that these situations or overmuch idiosyncrasy causes problems of intelligibility. Furthermore, the pressure towards conformity is strong in those participatory activities which the label 'community' has often been applied. As one contributor to a discussion about aggressive language said: 'You and I can talk any way we want on the Internet; the question is what

kind of conversation are we looking for and what kind of conversations are there online and how does one participate in them? Do we have to learn a new kind of language – “Netspeak”? [2,63].

Honorary Professor of Linguistics David Crystal mentions in his book “The Language Revolution” that communication on the internet is not just a variety of language but a whole new alternative in which to communicate, it needs a new type of language. Crystal calls this new alternative of communication “Computer-mediated communication” (hereby called CMC) or the language of CMC and he has named it as Netspeak.

It is important to remember that Netspeak involves both writing and talking as well as listening and reading [2,19]. We use Netspeak when we use “internet words” to describe something you could say straight out in traditional language.

The term *Netspeak* is an alternative to *Netlish*, *Weblish*, *Internet language*, *cyberspeak*, *electronic discourse*, *electronic language*, *interactive written discourse*, *computer-mediated communication (CMC)*, and other more cumbersome locutions. Each term has a different implication: *Netlish*, for example, is plainly derived from English and is of decreasing usefulness as the *Net* becomes more multilingual; *electronic discourse* emphasizes the interactive and dialogue elements. It is perhaps unsurprising to see *Netspeak*, as a term being given some popular currency – following the Orwellian introduction of *Newspeak* and *Oldspeak* in 1984, later developments such as *Doublespeak* and *Seaspeak*, and media labels such as *Royal-*

speak and *Blairspeak*. It is broader than *Webspeak*, which has also had some use. As a name, *Netspeak* is succinct, and functional enough, as long as we remember that ‘speak’ here involves writing as well as talking, and that any speak suffix has a receptive element including listening and reading [2,18]

The first of these points hardly seems worth the reminder, given that the Internet is so clearly a predominantly written medium and the question of how speech is related to writing is at the heart of the matter.

On the Internet, as with traditional speaking and writing, the language that individuals produce is far exceeded by the language they receive and as the Internet is a medium almost entirely dependent on reactions to written messages, awareness of audience must hold a primary place in any discussion. The core feature of the Internet is its real or potential interactivity.

There is a widely held intuition that some sort of Netspeak exists – a type of language displaying features that are unique to the Internet and encountered in all the above situations, arising out of its character as a medium which is electronic, global, and interactive. People are conscious of something out there is demonstrated by the way other varieties of language are being affected by it.

An interesting influence occurs in those languages, such as Spanish and Portuguese, which lack the letter w, and where the existence of WWW (World Wide Web) in effect adds an extra letter to their alphabet [2,18]

Moreover, There are some letters which have been created or developed by young people and are being used to chat especially on the Internet in our native Karakalpak. However, Some of these letters are not used in traditional writing and some of them do not exist in the alphabet of Karakalpak. For instance: The letter “w” is being used instead of the karakalpak letter “Sh” in the words such as *warwadim* (*sharshadim* – I am tired), *Barwinay* (*Barshinay*), the letter “K” instead of “Q” ; *kawan* (*qashan* – when), *kaytamiz* (*qaytamiz* – We will return), the letter “u” instead of “w”; *aua* (*awa* – yes), *oqiu kawan?* (*oqiw qashan* – When does the lessons start?), the number 4 instead of *ch* or *sh*; *4emodan* (*shemodan* – a suitcase)[the letter *ch* does not exist in Karakalpak] and etc.

The chat groups and virtual worlds also have their abbreviations and acronyms which turn up on e-mail, in personal Web pages and some of the commonest ones are listed below:

Ne qv? – *ne qilip atrisan'*, *JJt* – *Jaqsijatip tur*, *Janka* – *jan'aliq*, *O'z?* – *O'zin'nin' jag'dayin' qalay?*, *Norm* – *Ortasha (normal) jag'dayda*, *Kaz* – *hazir*, *kk* – *kerek*, *mn* – *menen*, *bn* – *benen*, *pn* – *penen*, *h-ham*, *u.n* – *ushin*, *lch* – *lichka*, *xb* – *xabar*, *tel* – *telefon*, *tg* – *telegram tarmag'i*, *gr* – *gruppa (topar)*, *nom* – *nomer*, *kbs* – *kim bar sette (tarmaqta)*, *mug* – *mug'allim etc.*

This style of writing or the usage of these mostly known abbreviations and nowadays that are used in online chatting are those we find anywhere we go to the internet discussions. They express the momentary feelings or circumstances. On

condition that we mention about abbreviations it is possible to say that specific type of new vocabulary form abbreviations newly emerged from the necessity of quick and outright communication by means of chat.

There is an obvious similarity and overlap with nowadays phenomenon of abbreviating anything that is possible. Crystal emphasizes that it is not a proof of dyslexia, mental laziness or being an illiterate. In the online communication we need to save time and we expect the immediate answer from the counterpart.

For the purpose of identifying the reasons of using abbreviations and acronyms on chatting, qualitative data has been collected through 100 respondents. Main research questions are:

How often do you use abbreviations and acronyms to chat on the Internet?

What is the reason for using them?

Do you agree with using abbreviations and acronyms?

According to the answers of the first question dealing with the frequency of abbreviation usage by students on the internet, active users who utilize every day accounts for 61 % while 5 % never use abbreviations on chatting which is noticeably lower and a third of students answered as “sometimes”.

The result of the second question shows that more than half of the respondents use abbreviations to save time while almost a third of the students consider that it could be Laziness. However a minority answered to this question as “I do not know”.

To the question No 3 a significant proportion of the students notified their

agreement answering as “No”. In contrast, the proportion of the respondents who agree accounts for only 7 % and more than a third of the respondents let us know their negligence.

There are so many possible answers to the questions dealing with netspeak. None of them is correct, none of them is wrong. This society always needs to come up with something new and certain people consider it necessary to learn new things. Some people, however, claim the netspeak to be a defacing feature of the languages today. However, We suppose that it is intentional or not to use technology and new words that comes with it is a hard question to answer.

There were certain reasons why we decided to use the questionnaire as a tool for the practical part of the thesis. The main of them that it is always simple to count an average from the ascertained

pieces of information and also the evaluating is sometimes very surprising. There were certain assumptions and projections before the evaluating itself. Some of them were confirmed, some of them were disproved, but the main statement remains untouched: the Netspeak is a developing feature and it slowly finds its place in modern linguistics.

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NEW SIGNALLING TECHNOLOGY FOR RAILWAY TRANSPORT

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Railway signalling systems are composed of several different systems; each has its own purpose, but the main functionality of the overall system is determined by the interoperability between them. Railway signalling systems ensure the safe operation of the railway network, and their reliability and maintainability directly affect the capacity and availability of the railway network, in terms of both infrastructure and trains. Signalling systems take up a large part of the railway's overall corrective maintenance. Railway managers need to have a holistic view of all systems to optimise maintenance. Signalling systems are especially important, given the need for interoperability. Given their complexity, knowledge must be correctly managed to ensure proper performance in all phases of the life cycle. Enhancing information logistics would lead to considerable improvements in this area.

Keywords: automatic block signals, network-based signal control system, train traffic control systems, railway, signalling systems, maintenance.

Системы железнодорожной сигнализации состоят из нескольких различных систем; у каждого своя цель, но основная функциональность всей системы определяется взаимодействием между ними. Системы железнодорожной сигнализации обеспечивают безопасную эксплуатацию железнодорожной сети, а их надежность и ремонтпригодность напрямую влияют на пропускную способность и доступность железнодорожной сети как с точки зрения инфраструктуры, так и поездов. Системы сигнализации занимают большую часть общего корректирующего обслуживания железных дорог. Железнодорожные менеджеры должны иметь целостное представление обо всех системах для оптимизации технического обслуживания. Системы сигнализации особенно важны, учитывая необходимость взаимодействия. Учитывая их сложность, необходимо правильно управлять знаниями, чтобы обеспечить надлежащую производительность на всех этапах жизненного цикла. Улучшение информационной логистики приведет к значительным улучшениям в этой области.

Ключевые слова: автоматическая блокировка сигналов, сетевая система управления сигналами, системы управления движением поездов, железная дорога, системы сигнализации, техническое обслуживание.

While technology is changing faster than the engineering techniques to cope with the new technology are being created, software is pervasive in our society: Its scope is widening more and more in many critical domains such as avionics, space, railway, automotive, nuclear, medical, and air traffic control. As a consequence, it is of utmost importance to assure the society at large that deployment of a given software-intensive system does not contribute to pose an unacceptable risk of harm. The railway network is a complex and distributed system with several technologies working together to fulfil the demands on capacity, speed and mobility to transport goods and passengers. The railway system can be divided into different systems depending on functionality, such as the rolling stock, the track, the power supply, the signalling system, etc.

A significant amount of development is taking place world-wide in signalling. Not only is this development in new technologies but also in the philosophies behind the execution of the safe movement of trains [1].

Conventionally, control of signals and motor points in the station yard has been by laying signal cable (metallic cable) from interlocking equipment and other logic equipment in the signal house to signaling devices in the field to control those by voltage control. That meant replacing or making improvements to the signaling system involved laying a huge volume of cable from the signal house to individual field devices along with many times that work in cable core wiring as

well as connection tests and the like over a long period of time for checking. As a result, construction in larger station yards is complex and difficult, and mistakes in construction could lead to transport disorders. We thus conducted development of a system based on a new concept whereby signaling devices such as signals and motor points in the station yard are connected to a logic controller in the signal house and signaling devices are controlled by digital data transfer. By introducing this system, we hope to achieve a reduction in the amount of cable laid, lighten the burden of wiring diagram creation and wiring work, and simplify connection tests. As a result, we expect to be able to reduce the risk of disruptions due to mistakes in construction [2].

This article provides an overview of network-based signal control system development, overview of and explains the major technical development elements of the network-based signal control system for station yards, network-based signal control system for automatic block signals, station yard logic controllers, and network-based level crossing control [3].

The objectives and current status of the individual steps are as described below.

Network-based signal control system for station yards.

Reduce cables and improve ease of work in signal installation by switching to an optical network.

Lighten the burden of wiring work by digital data transfer.

Reduce field testing by conducting preliminary tests in the factory.

The development of signalling is closely linked to the development of railways. It began as a manual system determining access to a line, but the growing demand for transportation and the increasing number of trains made this system inadequate. Advanced technologies were implemented to supervise and control railway lines. These were mainly analogue systems, based on relay technology (e.g. track circuit, axle counter, relay interlocking). Today these systems are being replaced by digital Dependability and maintenance analysis of railway signalling systems control systems based on electronics (e.g. balise, electronic interlockings, lineside electronic unit – LEU), but both systems coexist in most of the railway network. Over the years, many signalling and train control systems have evolved, creating a highly technical and complex industry. Every country has developed different solutions over the years [4].

With this software architecture, subsystems are unable to directly access the other subsystems. So, even if a software malfunction occurs, programs and data of other logic processing are prevented from being modified, thus preventing troubles from affecting other functions. And by making transfer of all data needed for control of multiple functions go through a common database, duplication of processing and data can be eliminated. Such an architecture allows for stopping and starting of processing and modification of programs by individual subsystem, thus increasing the durability of the software [5].

This paper proposes a framework to evaluate the safety and availability of railway operation, by quantifying the probability of the signalling system not to supervise the railway traffic. The following conclusions can be drawn:

The proposed methodology is successful on evaluating the safety and availability of the railway operation, focusing on railway signalling systems.

The results obtained from the model show that the probability of being in a state where operation is possible in a degraded mode is greater than the probability of not being operative at all, which reduces delays, but requires other risk mitigation measures to ensure safe operation.

Operational and environmental factors may have a great influence on the safety of the railway operation. Further work can be oriented to identify and measure the effects of external factors that can affect the performance of railway signalling systems.

Combining maintenance improvements to reduce the failure rate and increase the repair rate is more efficient at increasing the probability of being in an operative state and reducing the probability of operating in a degraded state than to only reducing the failure rate or increasing the repair rate.

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INSTAGRAM SNS AS AN INNOVATIVE MEANS IN ADVANCING FOREIGN LANGUAGE SKILLS OF LANGUAGE LEARNERS

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A first-year-master student, Uzbekistan State World Languages University, Tashkent, Uzbekistan "...state policy in the field of education should be based on its continuity throughout a person's life, starting from kindergarten."

Sh. Mirziyoyev

Annotation. *In this article the ways of using Instagram SNS in teaching foreign languages to language learners, especially who study at higher education. Besides that, the basic theoretical basis and results of utilizing this means in the process of teaching and learning foreign languages are outlined step by step with reasonable factors which serve to increase the efficiency of foreign language lessons with the help of the beneficial functions of the SNS as an innovative technology in the educational sphere of the Republic of Uzbekistan.*

Key words: instagram, innovation, online classes, infographic sources, virtual environment, video archive, material design, shareable function, innovative means.

Аннотация. *В данной статье рассматриваются способы использования сервиса социальных сетей Instagram в обучении иностранным языкам изучающих язык, особенно тех, кто учится в высших учебных заведениях. Кроме того, основные теоретические основы и результаты использования этой средств в процессе преподавания и изучения иностранных языков изложены шаг за шагом с разумными факторами, которые служат повышению эффективности занятий иностранным языком с помощью полезных функций социального сетевой сервис как инновационная технология в образовательной сфере Республики Узбекистан.*

Ключевые слова: *Instagram, инновация, онлайн-классы, инфографические источники, виртуальная среда, видеоархив, материальный дизайн, разделяемая функция, инновационные средства.*

Mobile-assisted language learning (MALL) has become one of the basic and most common forms of modern technologies in teaching and learning foreign languages. As we can cite the definition of the term MALL from the reference, such a finding can be illustrated: Mobile-assisted language learning (MALL) is language learning that is assisted or enhanced through the use of a handheld mobile device [3] [4]. MALL enables the specialists of foreign language teaching (FLT) to create a comfortable language learning environment which is highly necessary in the today's condition of the world education. In addition to that, MALL is such a process in which both a teacher and learners follow the basic principles of utilizing mobile devices and means during the lesson. This feature involves control-

ling the whole process systematically, namely while teaching a foreign language to higher education students a teacher uses a computer or laptop to prepare all the necessary materials which are distributed to learners, and the students use their mobile devices or tabloids to do the tasks which are presented on the applications of mobile devices. For this reason, it can be suggested that smartphones and tabloids can be used by learners during the lesson to do an effective research to reach the target in practice. Besides that, it is important to mention one thing that modern innovative technologies are the basic means of the today's modern and innovative education. As a result of this, the most significant objective of using them is to increase the efficiency in teaching and learning foreign languages according to the results of most researches done in the education sphere.

As the time is getting developed gradually and fast, it is impossible to prevent the students as users from using mobile applications for their studies because it is better to use those applications, such as Facebook, Telegram, WhatsApp, YouTube, Instagram, VKontakte and Viber as social networking services and messengers for their social needs. Taking this factor into account, this article investigates the basic functions of Instagram SNS, which is one of the most popular and common SNSs nowadays, in teaching foreign languages. As an innovative means and technology Instagram enables us the following functions that we can implement into the language teaching and learning environment:

Specialized accounts as pages for the students on the platform of Instagram.

Like other SNSs, we can create special accounts as pages for the students of higher education by which we can gather all of the on the same platform to work cooperatively. As we have planned to do so, our students have been interested in this feature and supported this idea because such pages are updated easily and daily with new materials and sources for them. By doing so, the bridge between the studies at university and the studies after the classes.

Convenient and informative posts to make the teaching and learning process modernized.

In order to have an effective and virtual language learning atmosphere, the platform of Instagram is such a comfortable means for the preparation and receiving feature. By highlighting this feature we want to mention that the specific peculiarities of this SNS creates this condition with the following functions:

photo post – a teacher can upload differently and attractively designed photo posts onto the platform which increases the efficiency of the materials of the lessons. For instance, we have applied infographic materials into the process as an innovative form using modern information communicative technologies. Furthermore, the functions of the SNS which are used to design the posts are much more effective in the process to reach the target right. **Instagram Stories** which is a feature that allows users to take photos, add effects and layers, and add them to their Instagram story [6], by which we have planned to use it as informing the students of the

contents of each lesson and their scores for their participation and tasks which has been as one of the most interesting factors of the SNS for the students.

video post – video posting feature of the SNS is different from other SNSs and messengers, namely the video duration is 1 minute as a video post on the basic platform of the SNS which may seem so short; however, we have decided to use infographic video sources to give the students short but informative videos via this function.

IGTV function of the SNS is much more beneficial to enhance the motivation and interest of the learners towards the lessons. Generally, GTV is a vertical video application launched by Instagram in June 2018 [6]. This is a video archive and player which can be used to save all the video or online lessons for the learners to use whenever they want to watch and use. Moreover, according to our observations, we have found out that the students have supported this idea because these video sources are very beneficial for them to prepare for their exams as additional materials to revise.

Texts below posts in developing the quality and quantity of the lesson sources. Like other SNSs and messengers, Instagram also includes texts below posts. As a result of this, we have decided to give brief and useful information for the students. The text information for each post with varied designs and methods has been one of the basic means for making the materials more effective than simple posts. According to our research objectives, we have planned to develop the

students' not only language skills, but also cultural competences during the process because it is important for language learners to have a broad world picture about the nation whose language they are learning as a foreign or second language. To implement this method into the practice, we have uploaded interesting facts and information about the English language and English speaking countries to interest the participants of our research.

Instagram Direct – this function is the platform of the SNS where a teacher and learners can work together to discuss the materials and themes while learning the target language. For instance, we have received a number of questions from the students on the materials and posts which we upload daily, and we have decided to form groups to gather the learners into mini-groups to optimize the process. This way has helped us to simplify the teaching process because it is remarkably easy to resolve the learners' problems which are connected with learning the target language in a convenient way, and for this reason the functions of the SNS have played an important role.

In addition to the above-mentioned functions of the SNS, the other effective functions, such as the following:

Shareable materials within other means by which the process becomes much more comfortable for learners;

Tagging function helps a teacher to inform learners of new posts or additional information according to their levels and progress in the process;

Interactive methods can be used on the platform of the SNS, and this can be

utilized while giving and receiving home tasks in different forms learners by which all the main four language skills can be fostered effectively.

Taking all the information which is mentioned above into account, we can say that the platforms of the SNSs are the real virtual environment in which the barriers of teaching and learning foreign languages may disappear making everything work well and systematically. As it is known to all that if everything works as a system, results will be the best as one can expect to obtain. Furthermore, *innovation means the future* [2]. Accordingly, we as future specialists of our field should follow new technologies and means to make our coun-

try developed and modern in the condition of the rapidly changing world.

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FORMATION OF LANDSCAPE DESIGN IN CHINA

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Хитой ландшафт дизайни ҳақида гапирар эканмиз, аввало бу жуда қадим-қадим даврларни ўз ичига олишини ва ўша даврларда яшаган инсонларни фалсафа, муҳит дизайни, гўзаллик, психология, ранг каби бир нечта йўналишлар ҳақидаги билимлари юқори даражада эканини алоҳида эътироф қилсак тўғри бўлади.

Развитие парков в разных странах и разных периодах имела разную концепцию. Говоря о китайском ландшафтном дизайне, мы должны прежде всего признать, что это включает в себя древние времена и что люди, которые жили в то время, имели много знаний о философии, окружающей среде, красоте, психологии и цвете.

Key words: terrifying, improving mood, tranquillizing, zigzag, bridge.

The development of Chinese garden-park art dates to the XII th century during the blossom period of the Assyrian cities. An example is a park of Emperor Chau (3200 BC). Since the 247 BC during his 41-year reign, the Emperor Tsing Hi-Hoang had expanded the territory around his gardens to 120 km, and built as many new palaces as he invaded countries and counties. Nearly 3000 varieties of trees were planted.

In the Chinese park art, two trends can be seen:

- creating large emperor parks;
- gardens with small residences;

For the Chinese park-garden art, various compositional methods had been featured, from the perspective of the space, observing the seasons and using its rules. The emergence of the first theoretical research allowed the consistent systematic development of park construction. Symbolism developed under the in-

fluence of Confucianism and Buddhism. Specific selection of plants had helped to achieve specific goals: to show the breadth of the surrounding conditions of straight cypress, creating the illusion of natural grassland landscapes with ever-green greens and leafy trees.

The scenery of Chinese parks was divided into three main types:

1) terrifying, 2) improving mood, 3) tranquillizing.

Terrifying landscapes always included the followings:

- artificial hills and rocks hanging over the head;
- a tree, pulled out with roots and blocking stormy streams;
- camel trees and spruces, obscuring the sun;

An improving mood scenery was created using the next elements and rules:

- a large sunny valley decorated with flowers;



A classic example of the Chinese park Zigzag – shaped bridge

- some plants, blooming in every season;

- filling the view with contrasts.

Contrasts had been reflected using specific methods:

- next to a willow with hanging down branches - a hastate spruce;
- camel wood with spiral-shape body and white-flowering leguminous tree;
- around conifer trees – cherries, apples, almonds, shrubs, siren, fragrant flowering, decorative plants and alpine roses.

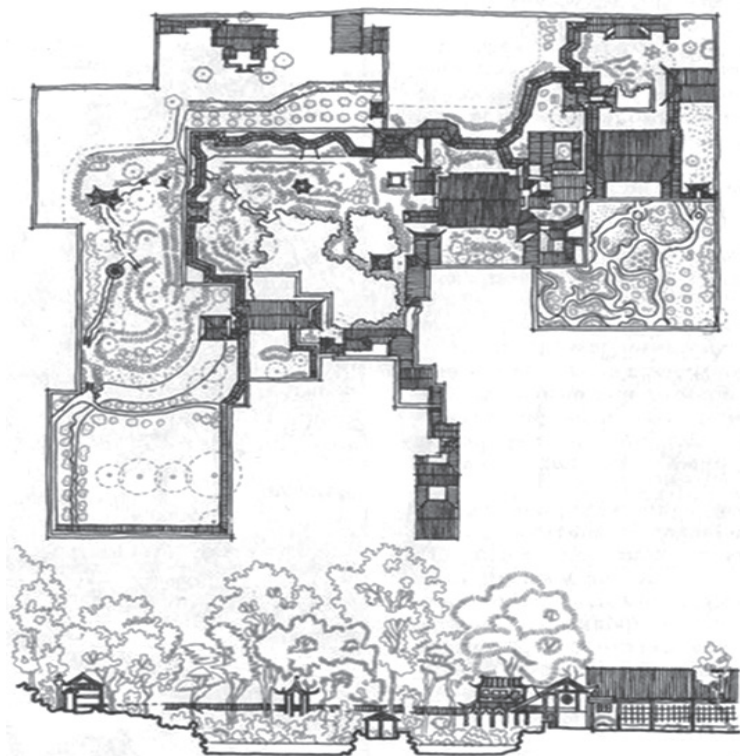
Tranquilizing landscapes consisted of:

- not big island with a small house of fisherman;
- a latticed temple on the rock;
- bent upon the water, branchy willow and bridge.

Water was an indispensable element of the Chinese gardens. The waterfalls covered large areas. The water flowed along artificial islands and peninsulas. All those required the construction of various bridges. The bridges were built as a zig-

zag-shaped (curved-looking), conditional ellipsoid, as people believed that “demons could only move on the straight path”. Gardens were mainly located next to the water: “Immersed in thoughts and remembering awnings”, “The awning that spreads the fragrance of the forest”, “The waiting awning”. The awnings were linked by covered galleries.

Parts of the park complex were connected to each other by stone windows – carved on the rocks and called as entrance windows. “Paylou” gates decorated emperor’s palaces, burial places, temples, monasteries, city streets and parks. Sculpture works (lion, bowl for ash, memorial stone) helped to create an entire park ensemble. The gardens were served as links connecting the giant structures with lightweight in shape, elegant terraces, awnings and galleries. “Iheuan Park” (tranquillity park) was located near the Emperor’s summer palace. One-fifth of the territory was occupied by mountains, flatlands and islands, and the rest was water.



The Lye Park in Su Chjou ("The Time Passed in Silence")

"Beihai Park" (North Sea) was built according to classic traditions in the centre of Beijing. In the centre – the mountains in the form of a small island. From one side, it was connected to the gallery with a white stone bar, and from the other side, there was a pavilion "5 dragons" upon the water. In the middle of the mountain were located terraces, temples, pavilions, and awnings.

In China, miniature parks were as popular as enormous ones. The main elements of the world were reflected in Chinese imagination (XV- XIV c.).

- a small lake with pine-tree;
- an awning for observing the scenery;

– trees, flowers, corridors, and even the bridge.

Chinese House was a complex of house and garden. Not only the house but also the interior was the continuation of the garden. In the southern province of Gyeongju, such gardens were planned to bring into the house. To do that, they slightly lowered the slope in the central part of the roof, surrounded by wall the open-air side of the room, and planted trees. In turn, the garden pavilions served as accommodation throughout the year.

• **Important features:**

- in China garden-park ensembles were of three types: large emperor



Beihai Park

- parks and gardens, gardens of temples and monasteries, small gardens near the settlements;
- the basic idea - religious beliefs connected with divination of natural phenomena and forces (Confucius, Daoism);
- active usage of stones;
- large amount of water surfaces, the smallest architectural forms, which were deeply thought out;
- choosing decoration plants for the predictable planned strict landscape;
- reanimation of the original landscapes, using the following principles:
- **yin** – to act regardless of local conditions;
- **jie** - to use the environment in an optimal way;
- determination of primary and secondary levels;



Beijing, China

- using contrasts – small and large, broad and narrow, high and low;
- getting more results with little action;
- trying to achieve a balanced equilibrium;
- considering the time factor when feeling the landscape.

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DYNAMICS OF EXCITONS IN BRANCHED CONJUGATED POLYMERS

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Abstract. *We propose the model for dynamics of excitons in branched conducting polymers which is based on the solution of Schrödinger equation with Coulomb potential on metric graphs (networks). We compute the exciton transport and scattering of charge carriers at the polymer branching points. Criterion for the regime of ballistic charge carrier transport is found.*

Аннотация. *Мы предлагаем модель динамики экситонов в разветвлённых проводящих полимерах используя решения уравнения Шрёдингера с кулоновским потенциалом в метрических графах (сетях). Мы вычисляем прохождение экситона и рассеяние носителей заряда в точках разветвления полимера. Найдён критерий для режима баллистического переноса заряда.*

Keywords: Conducting polymers, excitons, Schrödinger equation, metric graphs, ballistic transport

Modeling the charge carrier dynamics in conducting polymers is of practical importance for material and device optimization in organic electronics and polymer based photovoltaics. Functionalization of conducting polymers requires understanding of the mechanisms for charge carrier transport and their optimal control. Great progress has been made in the study of charge transport in conducting polymers so far [1]-[7]. Different types of charge carriers, such as exciton, polaron and soliton based charge carriers have been revealed. Excitons, which are the quasiparticle consisting of bound electron-hole pair, appear, e.g., in photovoltaic polymers, due to the photon impact. Trapping and travelling of charge by kink solitons in conducting polymers provide

another mechanism for charge transport. When neutral and charged solitons appear in bound state, they can form another type of charge carriers, which are called polarons. Each mechanism may play key role depending on the type of the functionalization method. Therefore effective utilization of these mechanisms in organic electronics requires developing different effective models for conjugated polymers. However, conducting polymers having branched architecture attracted much attention recently.

These are kind of polymers in which linear chain is splits into the two or more branches starting from some point which is called branching point, or node, or vertex. In this work we propose a model for exciton migration in in branched con-

ducting polymers by modelling the latter in terms of quantum graphs. Using the solution of the Schrodinger equation with Coulomb potential on quantum graphs, we compute such characteristics of exciton migration as scattering and transmission at the branching point, current on each branch, and coefficient for transmission. In addition, the condition for the regime, providing reflectionless transmission of excitons through the polymer branching points is revealed.

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ISSUES OF REORGANIZATION OF RURAL AREAS

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ANNOTATION

This article about the housing of rural ares. There are information of house building process in the Republic of Uzbekistan. In comparison with other countries, these houses divided into two parts. They are residential part and the farmhouses. Those houses were build comfortable for people.

Keywords: rural areas, slopes, yard composition, residential part

АННОТАЦИЯ

В этой статье рассматривается домостроение в сельских пунктах. А также рассматривается процесс строения домов в Республике Узбекистан. Строение этих домов имеет большую историю. Они построены для населения, учитывая их требования.

Ключевые слова: сельские местности, скаты и склоны, жилая часть,

Major changes in our country have a profound on rural areas. For the development of all rural plans our government has been implementing a comprehensive program. At the same number of difficulties for the promotion and development mountainous villages. Planners have sought to choose flat areas for residential buildings. But in rural conditions, land is not always flat for construction. There are a lot of slopes on the border, especially in the mountain areas. The traditional mountain construction experience of our people the construction of complex buildings is not only a comfortable environment for builders an attractive landscape of the village. More over placement of houses on inconvenient places will help to increase construction efficiency. Functional using of the rural areas will help to

mountain the required irrigated lands. That is why efficiency using rush and slope lands is very important en agriculture. This issues are particularly relevant for Uzbekistan, because two third part of territory situated in mountain skirts.

Experience in individual housing construction in rural areas can allow to using the relatively complex landscaping designs without any significant changes in the construction process, based on the correct disposal plans in the countryside.

When buildings are placed on the terrace method the sidewalk levels are flattened and they are constructed on leisurely spaces. Without terrace method, the slopes are almost unchanged. Because of the differences in the design of typical project, relevant changes will be made.

The slopes and the project will have changed particular in the mixed method. Also we have showed using column-beam method on building construction in slopes. There are three longitudinal sides of the horizontal slopes: parallel, perpendicular and diagonal. Alignment of slopes along parallel sloping rows along horizontals, it may be possible to mount the first floor level marks in the same position. But when placed horizontally, they need to have a downstairs or basement in the house for using this place as a car garage other farming purposes. This type of sloping scheme is less costly, making it difficult for constructors to build large buildings and streets.

Moreover, the climate of our country will be helpful for a good orientation of slopes. When residential houses were built individually, the system of water, heat and gas maintained the principles of consistent construction of engineering networks and it is recommended to install in a simplified local system, taking into account the specific usage plans. In fact, that usually farming houses are far from the residential buildings. That's why it is difficult of using farming houses and fields in slopes. There for, it is desirable to ensure that elements of the house are integrated in as much. As possible in designing. Currently, developing of the projects in relief areas, that's why such kind of construction processes be have been approved the Ministry of the Republic Uzbekistan. There are 3, 4, 5 and 6 rooms in these houses. Farming houses except garage are situated in the downstairs. Access to the house from the downstairs through

the garage and from the upstairs through the yard. Those and farming houses are planned close to each other or it may be adjacent. It is up to the relief of the territory. Given the climate of mountainous areas the application of such model projects, does not cost must to the land leveling, when implementing these projects in practice, we particularly should include some changes and we should add load-bearing walls, stone stairs, paths in certain places. It is known that the houses which are located in slopes, will be mudslides rain and snow water, mud show. To prevent such situation in homes, we should have built irrigation ditch in the back of house. Then the water and mudflow will by pass the house without destroying the house. Bearing walls through the borders of the terraces must be strengthened with stones and plants. We can plant the or another blackberry glasses in front of bearing walls or clay walls. Must be kept in mind the hygienic properties of the area. And light rays, wind direction, distance of water location, good conditions for gardening and farming. In conclusion, as we see building the houses at slopes very convenient and comfortable. Living in such kind of place is very attractive, the air is clean. The construction of such houses have a number of advantages.

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IN UZBEKISTAN, IN THE WORLD OF ARCHITECTURE AND ARCHITECTURE, IN THE WORLD OF MODERN ART

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ABSTRACT. *Before we can study fine arts, we must pay close attention to the development stage of its history. We need to learn more about the nature of the keywords. Graphic imagery of the graphic imagery is stored on our website. Wall paintings in the caves, stone and bone statues, embossed aesthetic ornamentation on stone plaques and deer kings have long been seen before the conscious imagination of human art. Art is one of the most ancient and precious arts. From the genres and genres of fine arts, especially the man-made genre, is characterized by its uniquely attractive colors. A young artist who works in the scene of the scene should be able to make the right choice when creating a composition. The composition plays a very important role in fine arts and enriches the imagination of young people and shapes their aesthetic taste.*

Key words. Country, Government, Republic, science

Introduction. The country is focused on education and world standards. «Our young people are rightfully proud and proud of our ability to take responsibility for the future of our Motherland and become a decisive force of today's and tomorrow's day. We are grateful to all of our large-scale work in this area, we must logically end our nationwide programs. For this purpose, the most important task of the Government, relevant ministries and agencies, and of the entire education system, our esteemed professors and professors, is to educate the younger generation in a sound, as well as educating them as mature people.

President of the Republic of Uzbekistan Shavkat Mirziyoev.

MAIN PART. On January 23, 1997, the Decree of the President of the Republic of Uzbekistan "On the Establishment of the Academy of Arts of Uzbekistan" № UP-1701, the Decree of the Cabinet of Ministers of the Republic of Uzbekistan dated 1 March 1997, the Academy of Arts of Uzbekistan was established.. Kamolidin Behzod National Institute of Arts and Design, Republic of Karakalpakstan. one of the lyceums of applied and applied arts started its work on the basis of the existing art school in the regions and Tashkent. From the very beginning of inde-

pendence of the Republic, great reforms have been made in all spheres, especially in the reform of the education system. In particular, the law "On Education" adopted at the 9th session of the Oliy Majlis of the Republic of Uzbekistan on August 29, 1997 and the National Program for Personnel Training is a clear example of this. These laws, along with other forms of education, attached great importance to the importance of aesthetic education and the art of its composition in the harmonious upbringing of the younger generation. Art is an integral part of the spiritual culture of mankind. One of the oldest and most common types of art is painting. The artist describes events and phenomena in his works, describing a particular aspect of various situations, describing the inner essence through the image, and describing the spiritual image, psychological state and ideas of people. As the artist draws a picture of a person, he is never limited to being just like himself, but through the image he tries to convey his thoughts and feelings to the audience. He first chooses a theme suitable for the idea, builds the composition of the event, searches it, monitors the nature, draws sketches, and creates elements.

Nowadays all the conditions have been created for young people to demonstrate their talents and talents. In the creation of young artists, the conditions are given to the art schools and higher education institutions, which meet the modern requirements. It is also a duty of every child of the country to contribute to the development of our country, using the opportunity and opportunity of gratitude for the creation of

such conditions. In the visual arts, the mirroring of the existence did not come about by itself, and it began to develop and develop with the appearance of human beings. The technique of teaching the students to work in colorful painting is a great way to make our students happy, to develop their talents, to develop their imagination, to develop their talent, to help our students grow up. The specialization of specialization in the field of education in our country is theoretically important. It is important to study the nature of human dysfunctions and their role in the development of optimal physiology. We need to contribute to the task of bringing up the contemporary art, the mature people, the ultimate goal of enriching the minds of children, the imagination of our younger generations through fine arts, the artistic creatures. The information provided by the user does not go unnoticed. The equipment is ready to help with the handling of the weapons of mass destruction, and they are ready to do so. We are deeply convinced that art should satisfy aesthetic needs and serve the aesthetic needs of the public. It does not only become an artist, but also a creator in perception of works of art. Therefore, it is important today to educate our material, spiritual wealth, to understand and analyze works of art. Instead, we must say that the great potential of Uzbekistan is the country.

CONCLUSION. In our country young people have been provided with adequate conditions for studying and studying their own talents as free creatures. Especially in the field of art, there are many opportunities, but only young

people can use these opportunities and lively, and love for their country of origin in their creative works is a good thing to create more and more works. All of us are proud and proud that our young people are rightly able to bear responsibility for the future of our Motherland and become a decisive force for our present and future.

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РАЗРАБОТКА ФУНКЦИОНАЛЬНОЙ СХЕМЫ РАДИОСИСТЕМЫ ПЕРЕДАЧИ ЦИФРОВОЙ ИНФОРМАЦИИ

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Ключевая слова: радиосистемы, фильтруются, РСП, диапазон СВЧ, цифровой поток, МСЭ-Р.

Аннотация

Developing the functional chart of radio system of digital data transmission

In the real work the function chart of radio system of digital data transmission is developed. The chosen wide dynamic range of the device does possible receiving effective full structure of the transmitter. I and Q signals are sent at first to the two-port digit-analog converter. Signals from an exit DAC by the simple FNCh consisting of discrete elements. Use of the active analog filter on the operational amplifier, provides additional strengthening of an output signal. The choice of a chip the MAX of 2022 allows a radio modem to answer on levels of noise without additional high-frequency RF filters that it considerably simplifies the scheme, its control and adjustment.

Разработка функциональной схемы радиосистемы передачи цифровой информации

В настоящей работе разработана функциональная схема радиосистемы передачи цифровой информации. Выбранный широкий динамический диапазон устройства делает возможным получение эффективной полной структуры передатчика. I и Q сигналы направляются сначала к двухпортовому цифроаналоговому преобразователю. Сигналы с выхода ЦАП фильтруются простыми ФНЧ, состоящими из дискретных элементов. Применение активного аналогового фильтра на операционном усилителе, обеспечивает дополнительное усиление выходного сигнала. Выбор микросхемы MAX 2022 позволяет радиомодему отвечать по уровням шумов без дополнительных высокочастотных RF фильтров, что значительно упрощает схему, ее настройку и регулировку.

Сегодня телекоммуникации являются основой развития общества, а информационные ресурсы становятся основным национальным богатством. Постоянно растущие объёмы передаваемой информации, расширение номенклатуры услуг и ряд других факторов ставят задачи непрерывного увеличения пропускной способности и скорости передачи данных в цифровых системах передачи. В настоящее время для этой цели используются радиомодемы, которые являются радиосистемой передачи и предназначены для передачи цифровых данных.

Под радиосистемой передачи (РСП) понимают совокупность технических средств, обеспечивающих образование типовых каналов передачи, групповых

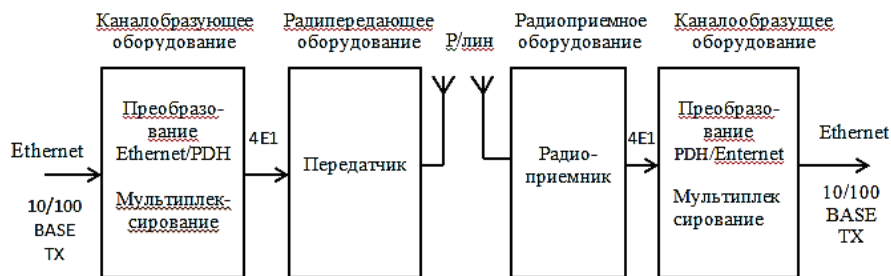


Рис.1. Структурная схема системы передачи

трактов и линейного тракта, по которым сигналы электросвязи передаются посредством распространения радиоволн в открытом пространстве [1].

Целью настоящей работы является разработка функциональной схемы радиомодема. Все оборудование системы передачи (рис.1) можно разделить на две части: каналообразующее и групповое оборудование (КГО) и приемо-передающее оборудование.

Каналообразующее и групповое оборудование на передающем конце обеспечивает преобразование входящего Ethernet трафика в потоки E1 с последующим мультиплексированием образованием потока E3. На приемном конце идет обратное преобразование сигнала (демультиплексирование и преобразование E1-Ethernet).

Для формирования радиосигнала и передачи его на расстояние в данном случае использован широкополосная радиосистема. Система радиосвязи вместе с трактом распространения радиоволн образуют линейный тракт. Радиопередающее оборудование состоит из передатчика и антенно-фидерного устройства. В конечном оборудовании на передающем конце формируется высокочастотный широкополосный сигнал.

На приемном конце производятся обратные операции: демодулируется высокочастотный радиосигнал и выделяется полезный сигнал. Приемник прямого преобразования непосредственно демодулирует ВЧ-сигнал на частоте несущей в основную полосу (полосу модулирующих сигналов), где сигнал можно детектировать и восстановить содержащуюся в нем информацию.

На передающем конце РСП происходит прямая квадратурная модуляция немодулированных сигналов, в результате спектр сигнала переносится в заданный диапазон СВЧ (2,4 ГГц), усиливается, фильтруется и с помощью антенны излучается в сторону принимающей станции.

В двусторонних РСП для передачи и приема радиосигналов противоположных направлений используется разделенный антенно-фидерный тракт (рис.1). В процессе передачи во всех звеньях РСП сигналы претерпевают определенные искажения. Причинами искажений являются воздействия различных помех и неидеальность характеристик элементов.

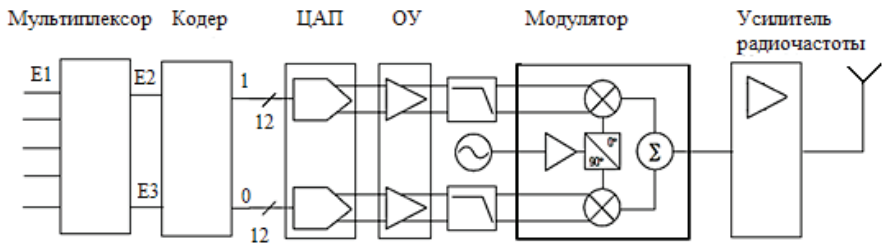


Рис.2. Структурная схема передающего оконечного каскада цифрового передатчика.

Помехи, возникающие в самой РСП, называются внутрисистемными. К ним относятся: тепловой шум, возникающий в радиоприемнике, оконечном оборудовании, антенно-фидерном тракте, и переходные помехи, возникающие при многоканальной передаче почти во всех элементах РСП. Кроме внутрисистемных помех на любую РСП оказывают влияние помехи от других стволов в многоствольных системах, от других радиоэлектронных средств (РЭС), радиоизлучения космоса, Земли, атмосферы и т.д. Из-за неидеальности характеристик элементов РСП появляются линейные и нелинейные искажения передаваемых сигналов [1].

На рис.2 приведена разработанная упрощенная структурная схема передающего оконечного каскада цифрового передатчика, принцип действия которого приведена ниже. Согласно Рекомендации F.596 МСЭ-Р цифровые системы радиосвязи могут соединяться с другим оборудованием только на вполне определенных иерархических цифровых скоростях [2].

На вход устройства формирования синфазного и квадратурного потоков (кодер) цифрового передатчика поступают цифровой поток E3. В результате скорость цифрового потока имеет эффективную скорость передачи 34 Мбит/с [1]. Далее сформированный цифровой поток разбивается на два потока, имеющих в два раза меньшую скорость – 17 Мбит/с. Эти потоки используются для формирования синфазного цифрового потока (I) и квадратурного цифрового потока (Q). Обработка сигналов осуществляется с помощью квадратурного модулятора.

В данной схеме используется модулятор MAX 2022. Он является универсальным устройством, которое может применяться независимо от вида модуляции, но с дополнительным преобразованием модулирующего и модулируемого сигналов. Квадратурные модуляторы – устройства балансного типа, не требующие фильтрации для выделения суммарной или разностной составляющей модулированного сигнала. Они могут также использоваться в качестве повышающих преобразователей частоты [2,3].

Квадратурный модулятор и преобразователь ПЧ в ВЧ (в передатчике), а также преобразователь ВЧ в ПЧ и квадратурный демодулятор (в приемнике) явля-

ются аналоговыми. На входе модулятора, отдельно в каждом квадратурном канале I и Q, используются ЦАП. В передающем канале сигналы с программируемой логической интегральной схемы (ПЛИС) поступают на ЦАП. Несущее колебание на выходе модулятора является высокочастотным [4].

Программируемая логическая интегральная схема АРА300-PQ352I (фирма Actel) осуществляет функции мультиплексирования E1 в поток E3. Эта микросхема позволяет объединить низкоскоростные каналы E1 в один высокопроизводительный магистральный канал E3.

В схемах современных цифровых приемопередатчиков цифровые модулятор и демодулятор. При этом на входе демодулятора должен стоять АЦП (обычно с дедиматором), а на выходе модулятора – ЦАП (с интерполятором). При таком включении АЦП и ЦАП преобразовывают не НЧ, а существенно более высокочастотный сигнал. В результате, модулятор и демодулятор работают при более высоких частотах дискретизации и, соответственно, при меньших шумах, вносимых цифровым преобразованием.

Основной элемент модулятора и демодулятора – перемножитель (смеситель).

На входы перемножителя поступают модулирующий сигнал, в общем случае выражаемый как

$$a_1 = A_1(t) \cos(\omega_1 t + \Delta\phi(t)) \quad (1)$$

где $A_1(t)$ и $\phi(t)$ – модулированные амплитуда и изменение фазы и опорное колебание $a_1 0 = A_1 0 \cos [(\omega_1 0 t)]$;

С выхода перемножителя снимается сумма двух колебаний – с суммарной и разностной частотами:

$$a_2(t) = A_1(t) \cos [(\omega_1 + \omega_0)t + \Delta\phi(t)] A_2(t) \cos[(\omega_1 + \omega_0)t + \Delta\phi(t)] \quad (2)$$

где $A_n(t)$ пропорционально $A_1(t)$.

Нужное колебание выделяется путем фильтрации или без фильтрации – в квадратурных преобразователях. Первая составляющая, с суммарной частотой $\omega_1 + \omega_0$, выделяется в повышающих преобразователях частоты, а вторая, с разностной частотой, – в понижающих преобразователях (при $\omega_1 > \omega_0$). При $\omega_1 < \omega_0$ вторая составляющая в выражении $A_2(t) \cos[(\omega_0 - \omega_1)t - \Delta\phi(t)]$

В модуляторах реализуется режим с ω_0 (при $\omega_1 = 0$), в демодуляторах используется составляющая разностной частоты, равной нулю (при $\omega_1 = \omega_0$).

Основные режимы квадратурных модулятора и демодулятора (смотри рис. 3.) – модуляция/демодуляция сигнала с синфазной $I(t_n)$ и квадратурной $Q(t_n)$ модулирующими послылками и модуляция/демодуляция аналогового сигнала с одной боковой полосой (ОБП).

В первом режиме модулирующие послылки – аналоговые, с постоянным уровнем в течение каждой послылки и дискретным изменением уровней от послылки

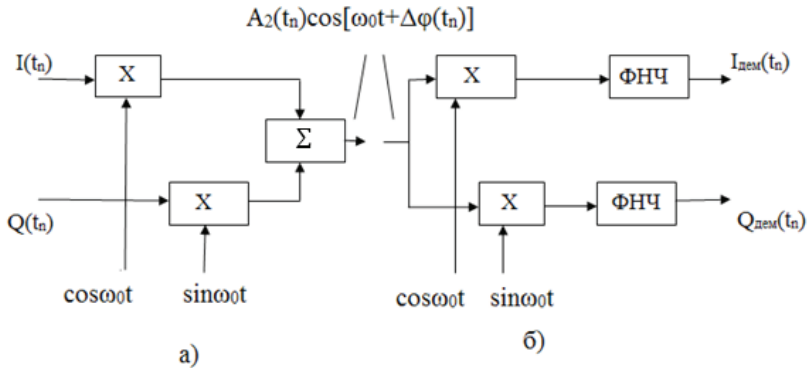


Рис. 3. Структурная схема квадратурных модулятора (а) и демодулятора (б).

к посылке. Уровни содержат информацию о цифровом коде модулирующего сигнала. На выходе модулятора:

$$\mathbf{I} \quad \mathbf{a} \mathbf{I}_{\text{мод}}(t_n) = A(t_n) \cos [(\omega_0 t + \Delta \varphi(t_n))] \quad (3)$$

где, $A(t_n) = \sqrt{I^2(t_n) + Q^2(t_n)}$; $\varphi(t_n) = \arctg [Q(t_n)/I(t_n)]$; – дискретно изменяемые амплитуда и фаза модулированного сигнала. Сигналы на выходе демодулятора:

$$I_{\text{дем}}(t_n) = k_{\text{дем}} A(t_n) \cos \Delta \varphi(t_n); Q_{\text{дем}}(t_n) = k_{\text{дем}} A(t_n) \sin \Delta \varphi(t_n)$$

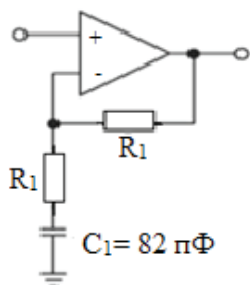
пропорциональны входным сигналам модулятора $I(t_n)$ и $Q(t_n)$. Отметим, что НЧ составляющие $I(t_n)$, $Q(t_n)$ на входе модулятора и $I_{\text{дем}}(t_n)$, $Q_{\text{дем}}(t_n)$ на выходе демодулятора представляют сигнал в прямоугольной системе, тогда как сигнал на выходе модулятора и входе демодулятора, согласно выражению (3), – в полярной системе координат.

В качестве квадратурного модулятора для разрабатываемого радиомодема используется устройство MX 2022 фирмы Maxim Integrated Products), которое является идеальным модулятором для ZIAF (zero-IF) (с нулевой ПЧ, или прямого преобразования) передатчика с одной несущей.

Широкий динамический диапазон устройства делает возможным получение эффективной полной структуры передатчика. Рис.2 иллюстрирует исключительно простую полную схему высокоэффективного передатчика.

I и Q сигналы направляются сначала к простому двухпортовому цифроаналоговому преобразователю MAX5873. Заземляющие (ground-referenced) выходы ЦАП фильтруются простыми ФНЧ, состоящими из дискретных элементов для уменьшения уровень шумов ЦАП.

В качестве простого аналогового фильтра используется активный эквалайзер (реализованный на операционном усилителе MAX4395), который подавляет не-



а)



б) Нормированная частота (МГц)

Рис.4. Схема простого аналогового фильтра выравнивания АЧХ ЦАП и результирующая АЧХ

равномерности характеристики ЦАП. Также данная схема обеспечивает допол-

нительное усиление выходного сигнала с коэффициентом $K_y = 1 + \frac{R_1}{R_2}$

Исключительно низкие фазовые искажения (шумы) MAX 2022 позволяют схеме отвечать требованиям по уровням шумов без дополнительных RF фильтров, что значительно упрощает схему, ее настройку и регулировку. $C_1 =$

Выход MAX 2022 соединен с усилителем радиочастоты MAX 2059, который обеспечивает усиление мощности несущей плюс 15 дБм. Данный усилитель с переменным коэффициентом усиления включает в себя гибкий цифровой контролируемый аттенуатор с диапазоном регулирования 56 дБ, что полностью отвечает самым высоким статическим и динамическим требованиям к контролю мощности.

Требования, предъявляемые к выходному усилителю передатчика, в значительной мере определяются видом модуляции сигнала [1].

В системах с квадратурной фазовой манипуляцией (QPSK) и квадратурной амплитудной модуляцией (QAM) нелинейные искажения сигнала в выходном каскаде передатчика могут привести к значительному увеличению вероятности ошибки при приеме сигнала. Поэтому при использовании квадратурной амплитудной модуляции в передатчике осуществляется адаптивная регулировка мощности, обеспечивающая минимальное суммарное значение вероятности ошибки.

Таким образом, выбранный широкий динамический диапазон устройства делает возможным получение эффективной полной структуры передатчика. Рис.2 иллюстрирует исключительно простую полную схему высокоэффективного передат-

чика. Применение активного аналогового фильтра на операционном усилителе MAX4395, обеспечивает дополнительное усиление выходного сигнала. Выбор микросхемы MAX 2022 позволяет радиомодему отвечать по уровням шумов без дополнительных высокочастотных RF фильтров, что значительно упрощает схему, ее настройку и регулировку.

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WHAT IS A MECHANICAL ENGINEER?

Toyirov Oqiljon

***Annotation:** Mechanical engineering is the study, design, development, construction, and testing of mechanical and thermal sensors and devices, including tools, engines, and machines. Mechanical engineering careers center on creating technologies to meet a wide range of human needs.*

Key words: engineering services, program robots, control systems

Mechanical engineering subjects include automobile engineering, manufacturing engineering, power plant engineering, thermal engineering, and mechatronics engineering, which is a combination of electrical, computer, and mechanical engineering.

What do mechanical engineers do? Mechanical engineers generally work in offices but are sometimes called to the field, visiting worksites when a problem or piece of equipment needs their personal attention, and to oversee elements of construction. Mechanical engineers work mostly in engineering services, research and development, and manufacturing.

Mechanical engineering has its roots in the industrial revolution with the advent of the steam engine, automated manufacturing, and the demands of railroad transportation requiring increasingly innovative and sophisticated engineering solutions.

EdX offers online mechanical engineering courses for free from top engineering schools. Whether you're interested in learning more about the history of mechanical engineering, or you want to pursue a mechanical engineering degree,

there's an opportunity for you to go beyond perusing mechanical engineering books and learn online.

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Mechanical engineers typically need a Bachelor's degree in mechanical engineering or mechanical engineering tech-

nology. All states require mechanical engineers who sell services to the public to be licensed.

The job outlook for mechanical engineers is bright, primarily because it is such a vast and interdisciplinary field. According to the Bureau of Labor Statistics there will be a projected 9% growth in the mechanical engineering field from 2016 to 2026.

Based on the same report, the median income for mechanical engineers in May 2016 was \$84,190 per year, with job prospects most abundant for those who stay up-to-speed on developments in this ever-evolving field.

Currently, a search for mechanical engineering jobs on Indeed.com yields over 50,000 results with 31,812 of those open positions commanding a salary of \$70,000 or more.

Sign up for classes today and take the first step in pursuing an in-demand and high-paying position as a mechanical engineer.

Mechanical engineering is a fast-paced, interdisciplinary field that offers opportunities to help design the future. With continued projected career growth, coupled with our globalized world's unceasing need for technological advancements and innovation in communication and travel, a career as a mechanical engineer can be challenging, rewarding, and lucrative.

Mechanical engineering is a diverse subject that derives its breadth from the need to design and manufacture everything from small individual parts and devices (e.g., microscale sensors and

inkjet printer nozzles) to large systems (e.g., spacecraft and machine tools). The role of a mechanical engineer is to take a product from an idea to the marketplace. In order to accomplish this, a broad range of skills are needed. The mechanical engineer needs to acquire particular skills and knowledge. He/she needs to understand the forces and the thermal environment that a product, its parts, or its subsystems will encounter; to design them for functionality, aesthetics, and the ability to withstand the forces and the thermal environment they will be subjected to; and to determine the best way to manufacture them and ensure they will operate without failure. Perhaps the one skill that is the mechanical engineer's exclusive domain is the ability to analyze and design objects and systems with motion.

Since these skills are required for virtually everything that is made, mechanical engineering is perhaps the broadest and most diverse of engineering disciplines. Mechanical engineers play a central role in such industries as automotive (from the car chassis to its every subsystem—engine, transmission, sensors); aerospace (airplanes, aircraft engines, control systems for airplanes and spacecraft); biotechnology (implants, prosthetic devices, fluidic systems for pharmaceutical industries); computers and electronics (disk drives, printers, cooling systems, semiconductor tools); microelectromechanical systems, or MEMS (sensors, actuators, micropower generation); energy conversion (gas turbines, wind turbines, solar energy, fuel cells); environmental control (HVAC, air-conditioning, refrigeration,

compressors); automation (robots, data and image acquisition, recognition, control); manufacturing (machining, machine tools, prototyping, microfabrication).

To put it simply, mechanical engineering deals with anything that moves, including the human body, a very complex machine. Mechanical engineers learn about materials, solid and fluid mechanics, thermodynamics, heat transfer, control, instrumentation, design, and manufacturing to understand mechanical systems. Specialized mechanical engineering subjects include biomechanics, cartilage-tissue engineering, energy conversion, laser-assisted materials processing, combustion, MEMS, microfluidic devices, fracture mechanics, nanomechanics, mechanisms, micropower generation, tribology (friction and wear), and vibrations. The American Society of Mechanical Engineers (ASME) currently lists 36 technical divisions, from advanced

energy systems and aerospace engineering to solid-waste engineering and textile engineering.

The breadth of the mechanical engineering discipline allows students a variety of career options beyond some of the industries listed above. Regardless of the particular path they envision for themselves after they graduate, their education will have provided them with the creative thinking that allows them to design an exciting product or system, the analytical tools to achieve their design goals, the ability to overcome all constraints, and the teamwork needed to design, market, and produce a system. These valuable skills could also launch a career in medicine, law, consulting, management, banking, finance, and so on.

For those interested in applied scientific and mathematical aspects of the discipline, graduate study in mechanical engineering can lead to a career of research and teaching.

BENEFITS OF E- LEARNING

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Abstract

In this article a reader will be apprehended about e-learning system and a wide range of profits that belong to e-learning in the way of educational process to reap the goals. It also makes users aware of distance learning's solutions that are dealt with what databases it demands and several systems in involves. E-learning system requires numerous steps and deals to reach the expected results, as it would be impossible to gain successful consequence by only placing information on the slides. Thus, this paper embodies numerous vital factors to be followed while utilizing distance learning system. Moreover, essential viewpoint of e-learning that is command, as the same measure, the cases of vitality are comprised in it. By this paper, students, as aimed, will be more acquainted with e-learning's advantages, how to use it successfully as well.

Аннотация

В этой статье читатель будет ознакомлен с системой электронного обучения и широким спектром прибыли, которые принадлежат электронному обучения, которые касаются, и нескольких систем. Система электронного обучения требует многочисленных шагов и сделок для достижения ожидаемых результатов, поскольку было бы невозможно получить успешные последствия, только размещая информацию на слайдах. Таким образом, эта статья воплощает многочисленные жизненно важные факторы, которым необходимо следовать при использовании системы дистанционного обучения. Более того, существенная точка зрения электронного обучения, которое является командным, как та же мера, случаи жизнеспособности заключены в нем. Благодаря этому документу студенты по своей цели будут больше знакомы с преимуществами электронного обучения, а также с тем, как его успешно использовать.

Since ancient times, people wanted to know about nature, the explanation of natural phenomena, understanding the language of animals. In Ancient Greece and Ancient Rome, children of noble families were trained in special schools, where they can get knowledge in mathematics, history, diplomacy and politics. In medieval Europe, families used to invite to their houses teachers for the edu-

cation of their children. Accessibility of such training was difficult to achieve the purpose.

At present, the development of innovative technologies allow you to be educated inspite of financial status, social status or age. The rapidity of the modern world requires the use of the fastest and the cheapest way of generation and transmission of knowledge.

E-learning – is a system synonymous with terms such as e-learning, distance learning- is the transfer of knowledge and control of the learning process using new information and communication technologies.

Experts of UNESCO gave definition to this term: “e-Learning - is learning with the help of media and internet”.

In the e-learning course are used an interactive electronic facility, information delivery, especially internet and corporate networks of companies are used, but one can not exclude other ways, such as CDs. E-learning system includes software and hardware solutions. It requires a special database, which contains learning content and monitoring system.

A full-scale e-learning system consists of three standard modules:

1. LMS-learning management system
2. Training content
3. All facilities

Experiences in working out e-learning courses and programs have shown that the use of pedagogical design gives a number of very tangible benefits:

- Students are able to get a full picture of the upcoming educational process and the actions that must be done to achieve the goal
- There is an opportunity to assess the quality of e-learning
- It helps to be transparent also it helps the audience to move consistently on the course of study, without any questions
- Indicates to the authors to place the material where the interactive components of the most appropriate and effective

- Sets the relationship between pedagogy and technology, allowing one advantageous complement each
- Provides the necessary tools for proper mixing techniques and delivery tools

To reach the goal while using net it is necessary not only to place the text a picture correctly on the screen, we need to create a sequence that hold the listener through all the steps of learning and training of new knowledge and skills.

E-learning includes on-line tutorials, instructional services, and technologies. A wide range of distance learning gives opportunity to choose the method of taking into account the individual requirements and preferences of the listener and more E-learning does not exclude communication with the teacher face to face:

- The convenient time and place for learning
- Knowledge of strong assimilation
- Permanent contact with the teacher
- Individual training schedule
- Gives an opportunity to save time and money
- Internet lessons are collection of video lessons by primary subjects school programs from the best tutors
- UniverTV - education video from teachers of high institutions

E- Learning Community specialists e-Learning PRO

- Medical Education Network
- Teaching English
- Library dedicated to the distance learning technologies
- E-Learning Portal
- Exhibition and Conference on e-Learning

- Higher economic education through the Internet

It is important in spite of the purpose of the course, it is impossible to achieve by simply placing information on the slides. You must use instructional design technology (instructional design) or the design of pedagogical systems (instructional systems design). These techniques make it possible to study the precise sequence of materials passing of practical tasks, knowledge test and other educational events.

Teaching design -a systematic approach to the construction of the educational process. The main thing is that it allows you to build a single system of training objectives, training material and tools available for knowledge transfer. At the core of instructional design the importance of the course content, style and consistency of the material, as well as ways of its presentation should be taken in account.

We also ought to consider followings:

- independent self preparing work with electronic gadgets, utilizing a personal computer, mobile phone, DVD-player, TV;
- obtaining help, advice, estimates from the remote expert (teacher), for remote interaction;
- the creation of a distributed user community (social networks), the leading virtual common training activities;
- hour timely delivery of e-learning materials;
- standards and specifications for electronic learning materials and technology, distance learning tools;
- shaping and improving the informa-

tion culture for all heads of enterprises and business units, and the mastery of modern information technology, improving the efficiency of its ordinary activities;

- the development and promotion of innovative educational technologies, the transfer of their teachers;
- to develop training Web-resources;
- the opportunity at any time and place get modern knowledge are at any accessible point the world;
- access to higher education for persons with special needs

In E- learning one of the important aspects is controlling. Firstly the aim of control is determining the success in orienting and performing activities by correcting them, Secondly stimulating regularly, intensive job of listeners, providing efficiency of specialists.

Why control is very important? Because the control of the listener, might be used, self-concept of the teacher, it is necessary to put forward to the control types of the demand, as efficiency of checking, the large scale of listeners and completeness scale of studied information.

Completely scope of checking the date will allow teacher to make sure of success not only separately elements by the whole process.

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МЕТОДЫ ЧИСЛЕННЫХ РЕШЕНИЙ ИНТЕГРАЛЬНЫХ УРАВНЕНИЙ В СРЕДЕ MATLAB

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Аннотация. С помощью численных методов решения интегральных уравнений в данное время можно решить различных исследовательских, инженерных и проектных задач. В данной статье рассмотрены методы численных решений линейного интегрального уравнения Фредгольма II рода и по этим методам составлена программа в среде MatLAB.

Abstract. With the help of numerical methods for solving integral equations at this time it is possible to solve various research, engineering and design problems. In this article, the methods of numerical solutions of a linear Fredholm integral equation of the second kind are considered, and a program in the MatLAB environment is compiled using these methods.

Ключевые слова: интегральное уравнение, ядро интегрального уравнения, квадратурная формула, вырожденное ядро.

Keywords: integral equation, kernel of an integral equation, quadrature formula, degenerate kernel.

Одним из наиболее важных условий прогресса в области решения различных исследовательских, инженерных и проектных задач является освоение и внедрение в практику прикладных разделов современной математики. К этим разделам относятся приближенные, численные и машинные методы решения интегральных уравнений, применение которых позволяет получить эффективные математические описания многих задач, как традиционных, так и новых. Аппарат интегральных уравнений прочно вошел в физику (теория волн на поверхности жидкостей, задачи спектроскопии, кристаллографии, акустики, анализа и диагностики плазмы и т. д.), геофизику (задачи гравиметрии, кинематические задачи сейсмоки), механику (колебания конструкций), материаловедение (исследование вязкоупругости, ползучести и т. д.), теорию управления (определение импульсной функции линейной системы, задача оптимальной линейной фильтрации и т. д.). Неуклонное расширение области приложения интегральных уравнений стимулировало интенсивную разработку их теории и особенно приближенных методов решения. Появилось много работ по исследованию свойств различных типов интегральных уравнений, а также возможностей методов решения. При этом методы аналитического решения, основанные на понятии резольвенты, преобразованиях Лапласа, Фурье,

Меллина, Бесселя и др., представляя собой мощный инструмент для исследования ряда практических задач, имеют вполне естественные ограничения в приложениях, поскольку ориентированы на определенный, далеко не полный круг линейных задач и трудно реализуемы на компьютере. В связи с этим новый толчок в развитии получили ставшие уже классическими метод механических квадратур, итерационные методы, проекционные методы (моментов, Галеркина – Петрова, коллокации и др.).

В данной статье рассмотрены методы численных решений линейного уравнения Фредгольма II рода и по этим методам составлена программа в среде MatLAB.

Линейное уравнение Фредгольма II рода имеет вид

$$y(x) - \lambda \int_a^b K(x,s)y(s)ds = f(x), \quad x \in [a,b], \quad (1)$$

здесь $y(x)$ – неизвестная функция, $K(x,s)$ – ядро интегрального уравнения, $f(x)$ – свободный член (правая часть) интегрального уравнения. Для удобства анализа в интегральном уравнении (1) по традиции принято выделять числовой параметр λ , который называют параметром интегрального уравнения.

Приближенное решение уравнения (1) с методом квадратур определяется с помощью следующей системы уравнений

$$y_i - \lambda \sum_{j=1}^n A_j K_{ij} y_j = f_i, \quad i = 1, 2, \dots, n. \quad (3)$$

Здесь $y_i = \bar{y}(x_i)$, $f_i = f(x_i)$, $K_{ij} = K(x_i, x_j)$, $\bar{y}$ – приближение к искомой функции y , A_j – веса квадратурной формулы.

Для алгоритма при $\lambda=1$ составим сетку $x_1, x_2, \dots, x_n$ – равномерную с шагом h . Систему (3) используя квадратурную формулу трапеций мы запишем следующим виде:

$$y_i - h \sum_{j=1}^n w_j K_{ij} y_j = f_i, \quad i = 1, 2, \dots, n, \quad \text{где } w_1 = w_n = 1/2, w_j = 1 \text{ при } j = 2, 3, \dots, n-1. \quad (4)$$

По этой формуле напомним реализующую вычисления на языке Matlab функцию *F_II_R.m*.

```
function [y] = F_II_ (K,f,a,b,h)
x = a:h:b; n=size(x,2); wt=1/2; wj=1; A = zeros(n);
for i=1:n A(i,1)= -h*wt*K(x(i),x(1)); for j=2:n-1 A(i,j)= -h*wj*K(x(i),x(j)); end;
A(i,n)= -h*wt*K(x(i),x(n)); A(i,i)= A(i,i)+ 1;end; B = zeros(n,1); for j=1:n B(j,1) =
f(x(j)); end; y = A\B;
```

Для примера с помощью функции $F_II_R.m$ решим следующее интегральное

уравнение
$$y(x) = e^2 - x - \int_{-1}^1 x(e^{xs} - 1)y(s)ds.$$

Для численного решения определяем ядро, параметр и свободный член интегрального уравнения $K(x,s) = x(e^{xs} - 1)$, $f(x) = e^2 - x$, $\lambda = -1$.

```
clear all; format long; h=pi/50; a=0; b =1;
x = a:h:b; lambda = -1; K=@(x1,s) x1*(exp(s*x1)-1)*lambda;
f = @(x1) exp(x1)-x1; y_approx=F_II_K,f,a,b,h); plot(y_approx);
```

Если ядро интегрального уравнения (1) является вырожденным, тогда можно найти приближенные решения уравнения с методом вырожденного ядра. Ядро интегрального уравнения (1) является вырожденным, если оно имеет следующий вид:

$$K(x,s) = \sum_{i=1}^m \alpha_i(x) \beta_i(s) \quad (5)$$

Будем считать, что $\alpha(x)$, $\beta(x)$ – линейно независимые системы непрерывных на отрезке $[a,b]$ функций. Подставим ядро (5) в уравнение Фредгольма второго рода, получим уравнение с вырожденным ядром:

$$y(x) - \lambda \int_a^b \sum_{i=1}^m \alpha_i(x) \beta_i(s) y(s) ds = f(x), \quad x \in [a,b]. \quad (6)$$

Поменяем в (6) местами операции интегрирования и суммирования, введя

обозначения для интегралов: $c_i = \int_a^b \beta_i(s) y(s) ds, i = 1, 2, \dots, m$.

Тогда получим следующее представление решения уравнения с вырожденным ядром (6):

$$y(x) = f(x) + \lambda \sum c_i \alpha_i(x), \quad x \in [a, b]. \quad (8)$$

Отметим, что константы c_i неизвестны, они являются интегралами от искомой функции. Для их вычисления построим систему линейных алгебраических уравнений, в следующем виде:

$$\begin{pmatrix} 1 - \lambda a_{11} & -\lambda a_{12} & \dots & -\lambda a_{1m} \\ -\lambda a_{21} & 1 - \lambda a_{22} & \dots & -\lambda a_{2m} \\ \dots & \dots & \dots & \dots \\ -\lambda a_{m1} & -\lambda a_{m2} & \dots & -\lambda a_{mm} \end{pmatrix} \begin{pmatrix} c_1 \\ c_2 \\ \dots \\ c_4 \end{pmatrix} = \begin{pmatrix} f_1 \\ f_2 \\ \dots \\ f_4 \end{pmatrix} \quad (9)$$

здесь $a_{ij} = \int_a^b \alpha_j(s) \beta_i(s) ds, f_i = \int_a^b \beta_i(s) f(s) ds, i, j = 1, 2, \dots, m$.

Таким образом, алгоритм решения интегрального уравнения с вырожденным ядром (6) состоит в вычислении интегралов a_j , f_i и решении системы линейных алгебраических уравнений (9). Решение уравнения (6) затем записывается аналитически в виде (8).

Если ядро интегрального уравнения невырожденное, но достаточно гладкое, тогда его можно аппроксимировать вырожденным, например, разложив в ряд Тейлора, а полученное уравнение решить описанным выше способом. В этом состоит метод вырожденных ядер.

Реализуем описанный алгоритм в виде функции *DF_II.m* на языке Matlab:

```
function [ y ] = DF_II(a,b,lambda,alpha,beta,f)
syms x; format long; n = length(alpha); r = zeros(n,1); % правая часть СЛАУ
M = zeros(n); % матрица СЛАУ; for i=1:n r(i) = int(beta(i)*f, x, a, b); for j=1:n
M(i,j) = -lambda*int(beta(i)*alpha(j), x, a, b); end end for i=1:n M(i,i) = 1 + M(i,i);
end c = M\r % решение СЛАУ y_x = 0; for i=1:n y_x = y_x + c(i)*alpha(i); end y =
y_x*lambda + f; end
```

Приближенное решение уравнения примера с методом квадратур и вырожденным ядром представлено в рис. 1.

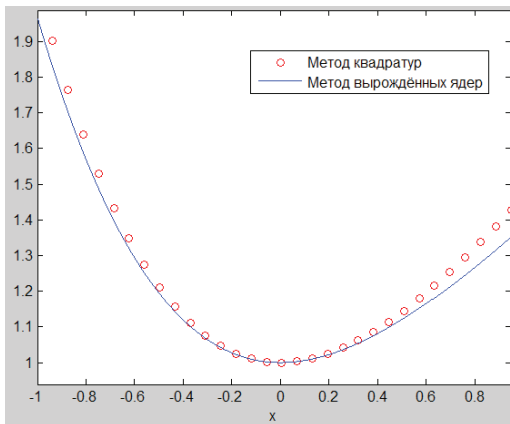


Рис.1. График численного решения с методом квадратур и вырожденным ядром

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SOCIAL NETWORKING IN FL TEACHING AS INFORMAL ONLINE INTERACTIONS

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Abstract: *According to this article, in virtual communities and platforms reproducing the social qualities of SNSs there is some potential for students to learn from informal communication and interactions. It has been suggested that informal activities in SNSs may allow the opportunity to re-engage learners with formal education and learning promoting in learners critical thinking about their learning process, which is one of the main issues at stake in formal education. In this sense, SNSs have been considered to offer the capacity to change the traditional educational system and to better motivate students as actively engaged learners.*

Key words: social networking, web-forums, online chats, online reading

Social networks are a social structure of nodes that represent individuals (or organizations) and the relationships between them within a certain domain. Therefore, social networks are usually built based on the strength of relationships and trust between the members (nodes). Scrutiny of the ways in which these nodes are connected has resulted in the identification of varying types of ties between nodes. The authors discuss the notion of describing connections in terms of strong and weak ties, or formal and informal relationships, respectively. In this context, a strong tie is one established directly between two people in the same network, whereas a weak tie is a relationship between two people connected through another person (two levels of separation).

One of the most common definitions of “social network” in sociolinguistics is offered by Meece who defines social networks as “the informal social relation-

ships contracted by an individual”¹. Previous research in offline social networks delineated that the network concept has proven to be a powerful analytical tool for a better understanding of the dynamics of L2 learning and it stressed the positive features of informal social networks in terms of L2 learning. Among the possible benefits of informal social networks and out-of-class spontaneous interactions in the TL in naturalistic contexts there is the enhancement of learners’ self-confidence, of their level of engagement in the use of the TL and of their interest towards the TL and culture². In out-of-class contexts, it was found that if learners are able to create their personal social networks, they can at the same time create opportunities to practice the TL. In recent years, with

1 Meece, J.L., Anderman, E.M., & Anderman, L.H. Classroom Goal Structure, Student Motivation, and Academic Achievement. *Annual Review of Psychology*, 57, 2006., 487-503.

2 Astleitner, H. Designing emotionally sound instruction: The FEASP-approach. *Instructional Science*, 28, 2000. 169-198.

the spread of the Internet and social media, the term “network” has been widened to the sphere of the online communities, web-forums, online chats and SNSs in particular, raising even more interest among L2 researchers. From 1997, when SixDegrees5 was founded, until the present time, SNSs have had a strong appeal to researchers, who have studied aspects of SNSs such as impression management, friendship performance, privacy issues, the possibility of building relationships and network structure. SNSs are defined as: web-based services that allow individuals to

1) construct a public or semipublic profile within a bounded system,

2) articulate a list of other users with whom they share a connection, and

3) view and traverse their list of connections and those made by others within the system. The nature and nomenclature of these connections may vary from site to site.

Learning and language develop through interaction with others, by means of internalizing problem-solving patterns that are first experienced in dialogue with others. Online, social language use frequently serves a ritual purpose similar to grooming done primarily to maintain social bonds in which it matters less what or how much one has written than the fact that something is written in profile fields which identifies the major groups (especially schools, for younger users) to which one belongs. On SNSs, exchanges are often quite brief and may use simplified language and spelling.

Reading is also different online; one does not read a website the same way one reads a book. Text is not necessarily the fundamental building block of a message on a website but, together with other media, serves as a piece of the overall message. On most web-pages, words are not meant to fulfill the same role that they would in text-only messages; they may work only to support the quickly processed images, and so scanning may be enough for comprehending such messages.

Social-networking sites have been used in the wider field of pedagogy, that is, to describe the stage of intellectual development in which learners have matured beyond the point of expecting fixed answers from teacher authority figures and are instead able to critically integrate new knowledge and other people’s perspectives in their own personal experiences and reflections. The two meanings of the term self-authorship that have been discussed here are intertwined.

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SPIRITUAL AND MORAL EDUCATION IN THE EDUCATION AT THE TECHNICAL UNIVERSITY

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Annotation: *This paper describes the system of educational activities for the employed, which is aimed at improving the moral education of students of a technical college.*

Keywords: education, morality, technical college, student

ДУХОВНО-ПРАВСТВЕННОЕ ОБРАЗОВАНИЕ В ОБРАЗОВАНИИ В ТЕХНИЧЕСКОМ ВУЗЕ

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Аннотация: *Данной работе описана система воспитательных мероприятий на занятиях, которая нацелена на совершенствование нравственного воспитания студентов технического вуза.*

Ключевые слова: воспитание, нравственность, технический вуз, студент

The formation of the Republic of Uzbekistan, the entry into a new stage of its development, is connected with the variable mentality of society and the individual, the change of value orientations among the younger generation. In these situations, children, adolescents and young people were most susceptible to negative trends, due to the lack of formation of ideological positions.

Today's spiritual and moral education needs a theoretical understanding of its methodological foundations. A new stage in the development of society has begun, connected with a change in the mentality of society and the individual, a change in value orientations among the younger generation. The spiritual and moral development of students is an essential as-

pect of the socialization of the individual in the conditions of the rapid development of society, which implies a gradual and conscious inclusion in various spheres of social activity and social life. Understanding spiritual values is becoming an important factor in the development of public and national identity. "Foreign language" has a significant feature: it is studied as a means of communication, and the topics and situations for speech are introduced from the outside. Therefore, a foreign language, like no other academic subject, is open to the use of content from various fields of knowledge, the content of other academic subjects. In the classroom, the teacher has the opportunity to shape the student's worldview, his moral character, since the sub-

jects, besides the area of specific competencies, affect the attitude and behavior of the student in a given life situation.

During the study of subjects in the specialty sound many pressing problems. Among them stand out such as the problems of tolerance, the problems of modern life, the problems of charity, the problems of materialism and national culture, the problems of poverty and the struggle against it.

Collective forms of interaction can be attributed to methods and techniques that promote the moral education of the student in the classroom. Among them are group and pair work. It is in groups and couples that this or that problem is discussed, it is in interaction with the surrounding children that certain points of view are formed. Thus, the discussion of the problem in this case is one of the methods of work. And the work does not end with just a discussion. The decision taken during the discussion of a problem is presented to the whole group, while the class chooses the best solution and justifies its choice.

The next effective method of working in the aforementioned direction is role-playing. Role playing is also a form of collective interaction. However, in this case, each student is already individually responsible for the decision. At the same time, in a role-playing game, the trajectory of the participant's behavior in a particular situation is usually pre-negotiated. Although in some cases only the result of the interaction can be negotiated, whereas the trajectory of behavior is left to the student's choice.

In conditions of higher education institutions, the learning process itself and, above all, the speech material, as well as the form of the lesson, should have a nurturing influence. Students show a great autonomy of thinking, interest in various phenomena of society, express their opinions, and seek to develop a personal point of view, their own views. Emotional impact and educational power of the word at this age are very large. Therefore, for the selection of texts, the main criteria were their artistic value, language value, humanistic orientation, compliance with the interests and level of knowledge of students, which in turn stimulates interest in the subject.

Texts can be used both during classes in the classroom, and in conditions of independent work at home. Work with students occurs initially using exercises designed for initial familiarization with the text and assimilation of the contained material, as well as the use of learned lexical units in speech with supports: retell it according to a predetermined plan, recreate parts of the mechanism.

Student age is a period of art fascination. The survey showed that among the favorite types of art – technology and mechanics. One of the characteristics of this age is dreaminess, fantasy. In the age interval from 16 to 20 years, the dominant development is the formation of morality, moral standards. The student, asserting himself as a person in a team, is most sensitive to the perception of moral criteria, the cultivation of such qualities as mercy, generosity, self-esteem. The polarization of the nearest environment

on their own and those of others begins, and the evaluation criteria are very strict. The uncontrolled formation of such criteria is fraught with manifestations of child cruelty. Therefore, it is important to learn to overcome the duality of assessments, to realize the ambivalence of feelings and to form an adequate code of honor, which, having been formed during this period is a very stable formation and is difficult to correct in subsequent years.

The senior course is the age of some kind of immaturity, "open emotion." At this age, such collective matters as specialty conferences arouse in students a diverse range of emotional states: enthusiasm, interest, readiness and desire for performance. Thematic evenings and preparation for them develop artistic abilities, a sense of collectivism, mutual assistance, instill a love of work.

Senior students were offered self-creative tasks (reports, projects). The report was read, the project was defended under music accompaniment; skillfully, selected films helped to protect projects.

In the project study, the teacher acted as a consultant, assistant, and an ordinary participant in the project, involved colleagues for discussion. Such forms of communication and joint creative communicative activities contributed to the moral and aesthetic education of students.

All project participants – both educators and students – work with interest, creatively, initiative, and informally. Students with great responsibility relate to such work, because they see its practical benefit. According to the testimony of teachers, students involved in projects show such qualities as responsibility, collectivism, and a sense of camaraderie.

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THE SPECIFICS OF UZBEK ONOMASTICS.

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***Annotation:** This article explores the place names, toponyms, hydrants, person names, surnames – the anthroponyms, and the ability to get enough knowledge and skills about their properties.*

Key words: onomastics, toponymy, anthroponics, onomastic terminology.

ОСОБЕННОСТИ УЗБЕКСКОЙ ОНОМАСТИКИ.

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***Аннотация:** В этой статье рассматриваются топонимы, гидранты, имена людей, фамилии – антропонимы, а также возможность получить достаточно знаний и навыков об их свойствах.*

Ключевые слова: ономастика, топонимика, антропоника, ономастическая терминология.

As soon as people consciously mastered the language, they began to give names to objects, phenomena, events and, of course, to the people themselves. Name – the main means of communication. There is always more to a name than just a “name” of a person; there is a certain meaning. The world is arranged incomprehensibly, but in our understanding it is reasonable. And therefore, from ancient times, it seems to people that the name of the invisible thread is connected with the past, future and present of its owner.

The history of the emergence of names, their meaning and meaning, the

connection with the history of society, with the worldview and beliefs of people is studied by a special science – onomastics. Literally, this term means “the art of giving names.” Names are given to objects of animate and inanimate nature. These are the geographical words of the name, the so-called toponyms, the names of space objects – astronomy, the nicknames of animals – zoonyms. But perhaps the largest group of proper names consists of anthroponomy – first and middle names, surnames of people, nicknames, and pseudonyms. In different countries, different nations have extremely diverse

names in their sound, origin and usage. Names – part of the history of the people. They reflect the life, beliefs, aspirations, imagination and artistic creativity of the peoples, their historical contacts. Each name bears on itself a bright print of the corresponding epoch.

Onomastics – the science of proper names of all types, the laws of their development and functioning. This discipline belongs to both philology and history; therefore, it is most often defined as a branch of linguistics and at the same time an auxiliary historical discipline.

Linguistic at its core, onomastics includes historical, geographical, ethnographic, cultural, sociological, literary components, helping to identify the specificity of the objects and traditions associated with their names, which takes onomasticism beyond the framework of linguistics proper and makes it an autonomous discipline, using mainly linguistic methods, closely related to the complex of the humanities, as well as the sciences of the Earth and the Universe.

Onomastic studies help to identify migration routes and places of former settlement of various peoples, linguistic and cultural contacts, and the more ancient state of languages and the ratio of their dialects. Toponymy (especially hydronymy) is often the only source of information about missing languages and peoples.

Первыми получили имена собственные сами люди, известные им места на земле, животные (домашние и дикие) и видимые небесные светила. Эти объекты и их имена заполняли ономастическое пространство древне-

го человека. Over time, this space has expanded; new types of objects have been named.

The world in which we live can truly be called the world of names and titles. Indeed, almost every real object (and often an imaginary one) has or can have its own name. At the same time, some names are so ancient that they are perceived as having arisen by themselves, since their author is unknown, and sometimes even the people whose language this word belonged to. The history of such names is hidden from us by the veil of time. This, in particular, distinguishes the names of some rivers, seas, mountains, stars. On the contrary, there are other names and names whose date of birth is set precisely or even widely known; they are often young, and the authors of these words are often known.

The boundaries of the world of onomastics, which make it possible to determine the number of such unusual words in our speech, are far from the eyes of even an experienced researcher: the statistics here also cannot be comprehensive – this is simply impossible. But for example, we can say that more than 200 thousand of Russian surnames are known.

Aspects of onomastic research are diverse. Descriptive onomasticism, which constitutes the objective foundation of onomastic research, which provides a general philological analysis and linguistic interpretation of the collected material; theoretical onomastics, which studies the general laws of development and functioning of onomastic systems; ap-

plied onomastics associated with the practice of naming, with the functioning of names in lively speech and the problems of names and renames, giving practical advice to cartographers, biographers, bibliographers, and lawyers. Onomastics of Uzbek works of art, constituting a section of poetics; historical onomastics, which studies the history of the appearance of names, and their reflection in the names of the realities of different eras; ethnic onomastics, studying the emergence of names of ethnic groups and their parts in connection with the history of ethnic groups, the relationship of ethn-

onyms with the names of other types, the evolution of ethnonyms, leading to the creation of toponyms, anthroponyms, the relationship of ethnonyms with the names of languages.

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ВЫЧИСЛИТЕЛЬНЫЙ ЭКСПЕРИМЕНТ ДЛЯ ИССЛЕДОВАНИЯ ВОЗБУЖДЕНИЯ СУБГАРМОНИЧЕСКИХ КОЛЕБАНИЙ В ТРЕХФАЗНЫХ ЭЛЕКТРОФЕРРОМАГНИТНЫХ ЦЕПЯХ

Абдуллаева Рухсора

Анотация: В работе рассматриваются свойства трехфазная электроферромагнитных цепей (ЭФМЦ) описывающей с помощью системами нелинейных дифференциальных уравнениями, в целом образуя математическую модель рассматриваемого явления автопараметрический колебание. Адекватность разрабатываемой математической модели достигается с учетом основных факторов и условий, в которых происходит рассматриваемый процесс. С повышением степени адекватности математической модели усложняется его вид, алгоритмизация задач на ПЭВМ.

Ключевые слова: нелинейная цепь, автопараметрические колебание, преобразователь частоты, конечно-разностных методов, численные методы, математической модели.

Рассматриваемая трехфазная электроферромагнитных цепях ЭФМЦ описывается с помощью системами нелинейных дифференциальных уравнений (комбинации дифференциальных операторов), в целом образуя математическую модель рассматриваемого явления. Адекватность разрабатываемой математической модели достигается с учетом основных факторов и условий, в которых происходит рассматриваемый процесс. С повышением степени адекватности математической модели усложняется его вид, алгоритмизация задач на ПЭВМ.

При этом особое место занимают вопросы адекватности математической модели и эффективности алгоритма, реализуемого на ПЭВМ.

Вопросы адекватности модели тесно связаны с возможностью получе-

ния практически важных выводов и рекомендаций. Следует, отметить, что если математическая модель адекватна, то она позволяет не только определять количественные характеристики изучаемых процессов, но и обнаруживать качественно новые явления рассматриваемых процессов.

Одним из основных методов, который дает возможность определить тенденцию изменения искомых переменных, является конечно-разностная аппроксимация дифференциальных операторов математической модели процесса.

Широкое использование конечно-разностных методов для решения задач технологического процесса привело к всестороннему изучению их как с точки зрения прогнозирования состояния рассматриваемого объекта со

временем и воздействия на них через совокупность технических и математических параметров.

Решения сложных задач с помощью конечно-разностных методов, как правило, представляют собой сочетание методов построения разностных аналогов задач, способов их реализации. Поэтому прогресс в конструктивной теории конечно-разностных методов обязан взаимосогласованному развитию указанных двух направлений исследований. При разработке численных методов должны привлекаться все доступные способы изучения задач: аналитические, точные решения, асимптотические оценки, размерный анализ, а также экспериментальные данные.

Численные методы, реализуемые на ПЭВМ, с точки зрения вычислительного эксперимента (ВЭ) должны быть экономичными, универсальными, также сходимыми и устойчивыми относительно ошибок округления.

При решении сложных задач необходимо обратить особое внимание на консервативность конечно-разностных аналогов рассматриваемых процессов, основанных на законе сохранения энергии.

Для того, чтобы написать разностную схему, приближенно описывающую данное дифференциальное уравнение с заданными начальными условиями, нужно предпринять следующие шаги:

- необходимо выбрать шаг интегрирования по временному слою, который обеспечивает консервативность конечно-разностной модели;

- заметить область непрерывного изменения аргумента (время) на область дискретного его изменения;

- заменить дифференциальные операторы некоторым разностным оператором, а также сформулировать разностный аналог для начальных данных.

В итоге на основе вышеизложенной процедуры, можно решить математическую задачу с помощью ПЭВМ.

Остановимся на технологии проведения ВЭ, с помощью которого можно решить поставленную технологическую задачу.

В последнее время, как в отечественных, так и зарубежных исследованиях большое внимание уделяется ВЭ как методу научных исследований с применением новой информационной технологии [1, 3].

ВЭ занимают основную часть в исследованиях данного процесса и включает в себя: постановку задачи, алгоритм решения задачи, программирование на алгоритмическом языке, проведение расчета на ПЭВМ

Для проведения ВЭ необходимо выбрать конкретный метод и алгоритм решения задачи. Аналитические методы решения технологической задачи пригодны для упрощенных моделей процесса, в которых невозможно учитывать все естественные факторы, граничные и начальные условия. С появлением ПЭВМ нового поколения с большим быстродействием и объемом памяти начали все сторонне развиваться и численные методы, эффективно реализуемые на

ПЭВМ для решения задач технологических процессов. Простейшая схема проведения технологического цикла ВЭ приведена на рис.2.

Центром внимания ВЭ является контроль и анализ результатов вычисления на основе тех или иных критериев оценки численных расчетов.

Под контролем ВЭ следует понимать комплекс мероприятий, обеспечивающих получение надежного результата с заданной степенью точности. Процедура контроля ВЭ включает в себя уравнивание материального баланса, законы сохранения различного типа и т.д.

Другим вопросом проведения ВЭ является экономия машинного времени реализации данной задачи и памяти ПЭВМ. Это цель достигается путем увеличения шага интегрирования по времени. Но здесь необходимо подчеркнуть, что увеличение шага интегрирования может привести к неверному результату из-за накопления ошибок округления.

Во избежание таких ситуаций в настоящей работе используется неравномерный шаг интегрирования по временной переменной, в результате чего уменьшается число узлов, тем самым сокращается объем вычислений на ПЭВМ, что приводит к замедлению роста погрешности ошибок округления. Для достижения этой цели мера

погрешности аппроксимации должна изменяться в интервале [2]

$$2^{-g} \cdot \varepsilon \leq \Delta t \leq \varepsilon,$$

где $\varepsilon > 0$, $g \geq 1$ постоянные параметры, определяемые в ходе ВЭ. Учитывая указанные выше условия, шаг интегрирования по времени выбирается следующим образом

$$\Delta t_p = 0.5 \Delta t_{p-1}, \Delta t > \varepsilon,$$

$$2 \Delta t_{p-1}, \Delta t < 2^{-g} \cdot \varepsilon.$$

Определение Δt должно выполняться из условия $\Delta t' < \Delta t_p < \Delta t''$, где $\Delta t''$ – определяется требованием условий устойчивости и сходимости вычислительного алгоритма; $\Delta t'$ – выбирается из соображений ограничения роста ошибок округления.

Таким образом, определяются основные критерии проведения численного расчета на ПЭВМ, с помощью которого можно реализовывать задачи последовательно.

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PHYSICAL CHAEACTERISTICS OF SALINE SOILS ON AUTOMOBILE ROADS

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Annotation: *This article provides information about the basic parameters of physical properties of the saline soils in roadside of highways, the key and rational indicators which are determined by the experiments and by calculating respectively in the evaluation of soil physical states, the density of solid particles, the basic parameters of density and moisture of the soil in natural condition.*

Аннотация: *В данной статье приведены основные показатели физических свойств в засоленных почвах земполотна автомобильных дорог являющие основными показателями влажности и плотности в естественном состоянии грунта, плотности твёрдых частиц, используемые для определения основных и расчетных показателей с помощью эксперимента.*

Key words: *soils, physical properties, density, roadside, stability*

Ключевые слова: *грунты, физические свойства, плотность, земполотна, прочность.*

In line with the Decree of the President of the Republic of Uzbekistan dated February 14, 2017 PD-4954 «On Measures for Further Improvement of the System of Management of Roads», identify the prospects of development and improvement of automobile roads, ensure the preservation of intercity rural roads, cities, towns, villages, community existing streets network, ensuring their traffic usage to be in a high level, organization of scientific research, introduction of innovative technologies and modern standards in the design, construction, reconstruction, repair and maintenance of highways as well as, ensure the compliance to the town-planning norms and

regulations, quality standards in the fields of design, build, reconstruction, maintenance and preservation was identified.

In the evaluation of soil physical states, the key and rational indicators are used which is determined by the experiments and by calculating respectively. The density of solid particles is the basic parameters of density and moisture of the soil in natural condition. The density of the soil in dry condition (soil skull), soil porosity, porosity ratio, moisture level and density in clay condition are the rational indicators. They are calculated based on key indicators.

Usually, soils consist of hard particles with a certain mass and water as well as

Table 1

Classification of soil by salinity level

Type of soils	The total amount of light soluble salts ratio to the dry soil weight, in %	
	chloride, sulfate-chloride salinization	sulfuric chloride-sulfate salinization
Poorly salted	0,5 -2,0	0,5-1,0
Average salted	2,0-5,0	1,0-3,0
Strong salted	5,0-10,0	3,0-8,0
Very strong salted	more than 10.0	more than 8.0

the air which is mass of zero. In some cases, air can be replaced by water (in soil saturated with water) or vice versa, the air in the place of water (in dry soil). Let it be, the mass of the mineral particles in any tested sample is M_c , volume V_c , the size of the cavities in the soil V_o , the mass of the water in these pits M_w . The quantities and proportions of these components directly determine the physical state of the soil.

The structure of the soils, salinity feature and level which are used at the upper part of the roadside in road construction divided according to Tables 1-2.

In the area spreading saline soils, the roadside should be designed with regard to the level of salinity to be determined on the basis of Table 1-2. When it is complied with the standards of non-saline soils, it is permitted to use low and middle saline soils for protrusion, including the working surface.

When compulsory protective action from moisture of the working surface is prevented, strong and middle saline soils are more useful as protrusion, as well as working surface materials in regions of the II type of moisturizing. In moisturized saline soil areas, the roadside should be designed with compliance to requirement of soft based protrusion.

When evaluating the state of the soil water saturation level, humidity content named indicator is used.

The humidification value can be changed from 0 dry soils) to 1 soil saturated with water). If this indicator is between 0 and 0.5 – the soil is poorly moistened; if it is from 0.5 to 0.8 – moistured, from 0.8 to 1, the soil is considered water-saturated.

Soil density levels depends on their moisture content in many respects. The humidity which gives possibility of gaining the greatest value of the density of soil skull in effect of unchanged (standard) density is called optimal moisture of the soil. The values of this indicator are set using experiments for each type of soil. The values of optimal moisture content in fine-grained and powdered sand are 8... 14%; in sandy soils 9... 20%; in normal soils 12... 20%; and in clay soils vary from 16 to 30%.

Special soils are: muddy; lessing soil; clay, quaternary soils, shale, spiny sand, artificial soil (industrial waste).

Soft soils include joined soils which are naturally strong to move less than 0.075 MPa (in testing with rotating tool) or when loaded at 0.25 MPa the sedimen-

Table 2

Classification by salinity of Less and Lesser Soil

Type of soils	The total amount of light soluble salts ratio to the dry soil weight, in %	
	chloride, sulfate-chloride salinization	sulphate, chloride-sulphate salinization
Poorly salted	0,5-2,0	0,5-1,0
Average salted	2,0-5,0	1,0-3,0

tation module is more than 50 mm / m (deformation module less than 5.0 MPa)

When test data missed, it is recommended to include muddy, clay (including lessing soils consistency level more than 0.5), and the moisture soils containing chlorine salts.

Powder-gray soils with more than 50% (0.05-0.005 mm) dust particles, light and average soluble salts and calcium carbonate, should be included into the lessing soils. Lessing soil has the ability to maintain steep sloping with the same composition, in its natural state with a high porosity, low dampness. Low moisture-free soils when moistured is drown, it is easy to get wet and washed, and when soil saturated with water you can switch to the flowed state

On plots with high moisture, engineer-geological explorations are carried out in accordance with the special program specified in the technical assignment. The program and the technical assignment will be developed jointly by design and exploratory organizations. The materials obtained during the exploration, generally it gives the possibility to implement the followings:

- quantitative assessment of the stabilization of the base;
- forecasting the value and duration of the base in consolidation process.

In general, these materials should evaluate the possibility of using high moisture layer as a protrusion material.

The program can be edited after receiving the actual data of exploration works from the design organization.

The project documents provide for the control of geotechnical controls on protrusion studies and status of protrusions during the construction and after completion (during warranty period)

Engineer-geological explorations may include the following types of works:

- exploration and collecting, analyzing and summarizing data from previous years;
- Receiving and decoding material for aerospace materials;
- recognizable checking with aerovisual and route transmissions;
- crossing rock caves;
- geophysical study of the area;
- field surveys;
- hydrogeological research;
- stationary observations;
- Study of soil and water in laboratory conditions;
- prediction of possible changes in geological conditions;
- processing of materials;
- Creating (conclusive) a technical report.

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ВЛИЯНИЯ КОНЦЕНТРАЦИИ ДИСПЕРСНЫХ ЧАСТИЦ ПРИ ДИФфуЗИОННОМ ГОРЕНИИ ТУРБУЛЕНТНЫХ ТВЁРДЫХ СТРУЙ

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Abstract

The article considers a one-parameter model of turbulent viscosity is used, which adequately reveals the physics of the process of diffusion burning of coal particles in a gaseous medium, investigated the effect of the concentration of dispersed particles.

Keywords: heterogeneous combustion, diffusion, turbulent viscosity, dispersed particles, concentration, gas, conservation laws, jet two-phase flow.

Аннотация

В статье рассмотрена однопараметрическая модель турбулентной вязкости, адекватно раскрывающей физику процесса диффузионного горения угольных частиц в газовой среде, исследована влияния концентрации дисперсных частиц.

Ключевые слова: гетерогенного горения, диффузия, турбулентная вязкость, дисперсные частицы, концентрация, газ, законы сохранения, струйная двухфазная течения.

Математическое и численное моделирование процессов перемешивания и горения многофазных реагирующих газовых смесей с твёрдыми частицами в турбулентном режиме является одним из сложных разделов механики реагирующих систем и поэтому исследования турбулентного горения частиц в газовом потоке, содержащем окислитель, является весьма сложным процессом и сопровождается такими явлениями, как прогрев частицы по объёму, испарение ее материала с поверхности, встречная диффузия окислителя и продуктов реакции в газовой фазе, образование твердой оксидной оболочки, радиационный теплообмен с окружающей средой и другими. Поскольку решение задачи в полные постановки представляет значительные трудности, рассмотрим простейший случай чисто гетерогенного горения дисперсных частиц в турбулентной неизотермической струе.

Как известно, методы расчета турбулентных двухфазных потоков могут быть разделены на две группы: к первой группе относятся работы, основанные на смешанном эйлерово-лагранжевом описании движения среды; а вторая группа объединяет работы, использующие эйлерово представление уравнений движения и энергии для обеих фаз [1-4]. Одной из главных проблем в этом случае является определение турбулентных напряжений и турбулентного теплового потока в дисперсной фазе.

Турбулентная двухфазная струя аэрозвеси вытекает из плоской щели, высота которой составляет, $a (=0,01\text{м})$ и, реагируя с окружающей средой, рас-

пространяется в спутном потоке окислителя при диффузионном горении. В рассматриваемой задаче струя представляет собой смесь инертного газа, кислорода, продуктов реакции и дисперсных частиц (соответствующие показатели обеспечены индексами g и p соответственно). Давление струи и окружающей среды считаются постоянными, т.е. $P_1 = P_2 = P_{атм} = const$, а число Люйбса равно $Le=1$ т.е. $Sc = Pr$). В расчетах принимали $Sc = Pr = 0,50$. С учетом вышесказанного, система дифференциальных уравнений плоской турбулентной двухфазной струи для осредненных величин в приближении пограничного слоя имеет вид как в [1-4].

В качестве примера рассматривали горение пылевидного углерода в воздухе:



Уравнение состояния несущей фазы приняли в виде:

$$P = RT_g \left(\frac{1}{m_2} + C_1 \left(\frac{1}{m_1} - \frac{1}{m_2} \right) + C_3 \left(\frac{1}{m_3} - \frac{1}{m_2} \right) \right) \rho_g. \quad (2)$$

Система дифференциальных уравнений [1-4], с учетом (2) дополняется следующими выражениями:

$$h_g = c_{pg} T_g + \frac{u_g^2}{2} + \sum C_i h_{gi}^*, \quad h_p = c_{pp} T_p + \frac{u_p^2}{2} + C_2 h_p^*,$$

$$m = \left(\sum_{i=1}^4 \frac{C_i}{m_i} \right)^{-1}, \quad c_{pg} = \sum_{i=1}^4 C_i (c_{pg})_i \quad (3)$$

C_p – теплоемкость при постоянном давлении и h_i^* – теплота образования i -го компонента.

Для коэффициента турбулентной вязкости используется формула как в [3]:

$$\rho_g u_g \frac{\partial v_g}{\partial x} + \rho_g u_g \frac{\partial v_g}{\partial y} - \frac{\partial}{\partial y} \left(\rho_g v_g \frac{\partial v_g}{\partial y} \right) + \rho_g v_g k_0 \left(\frac{\rho_g^0}{\rho_g} \right) \left(\frac{\partial u_g}{\partial y} \right) + C_0 v_g \left(u_g \frac{\partial \rho_g}{\partial x} + \frac{\partial \rho_g}{\partial y} \right), \quad (4)$$

где k_0 , C_0 – неизвестные эмпирические коэффициенты. Силовые и тепловые взаимодействия фаз определяются по [1-3].

Массовая скорость потребления окислителя находится по выражению [2]:

$$J_1 = \frac{6}{\delta \rho_p^0} \rho_g C_1 \rho_p \frac{K}{1 + K / K_D}. \quad (5)$$

Система дифференциальных уравнений (1) с учетом (2)–(4) решается при граничных условиях как [1-3].

Для численного реализации решения задач предложен алгоритм, разработанный на основе метода конечных разностей с введением фиктивного времени и использованием метода расщепления уравнений переноса по пространствен-

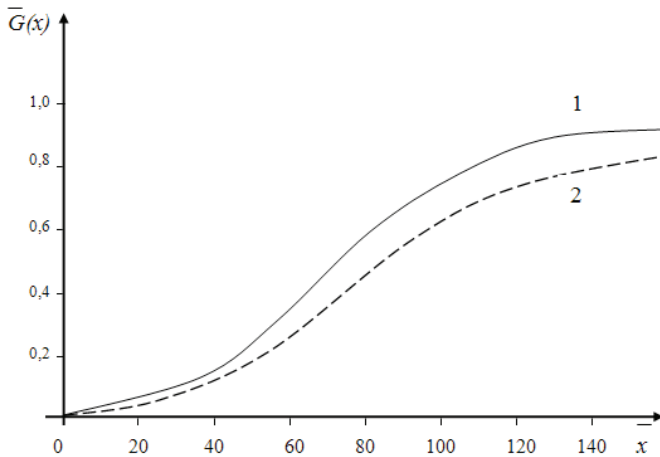


Рис. 1. Зависимость доли выгоревшего горючего $\bar{G}(\bar{x})$ от расстояния сопла ($1 - n_{pz} = 2 \cdot 10^9 \text{ м}^{-3}$; $2 - n_{pz} = 3 \cdot 10^9 \text{ м}^{-3}$)

ным координатам, метода прогонки и итерационного процесса [3]. Необходимые для проведения расчета исходные данные заимствовали из работ [2]. На срезе сопла горючее представляет собой смесь, содержащую 50% инертного газа, 10% кислорода, 20% продукта реакции, 20% фракций угля с начальным диаметром $d=50 \text{ мкм}$ и степенью черноты 0,85.

$$\text{Величина } \bar{G}(\bar{x}) = \frac{\int_0^{\bar{x}} \int_0^{\bar{y}} \bar{y} \bar{J}_2 d\bar{y} d\bar{x}}{\int_0^1 \bar{y} \bar{u}_p \bar{\rho}_p d\bar{y}} \Big|_{\bar{x}=0} \text{ выражает отношение массы}$$

сгоревшего углерода к начальному расходу частиц. В случае меньшего значения n_{pz} относительная скорость выгорания частиц выше. Это также объясняется более интенсивным выгоранием кислорода в условиях большей концентрации частиц и соответствующим снижением скорости реакции в расчете на одну частицу. На расстояниях, больших чем рассматриваемые на рис. 1, эта величина должна уменьшаться вследствие того, что частицы начнут исчезать.

Как показывают расчеты, при больших входных температурах и меньших размерах угольных частиц изменение $\bar{G}(\bar{x})$ будет интенсивным. Это объясняется тем, что с уменьшением радиуса частиц отношение общей площади частиц к их общей массе увеличивается. Т.е. увеличивается площадь, которая характеризует интенсивность радиационного и конвективного теплообмена, а также увеличение значения вероятности столкновения молекул взаимно реагирующих веществ. Из этого также можно утверждать, что в турбулентном диффузионном факеле интенсивность выгорания гомогенного топлива различна чем, гетерогенного топлива. На начальном участке и на вершине факела интенсивность выгорания топлива минимальна. Эти данные находят экспериментальное подтверждение [4].

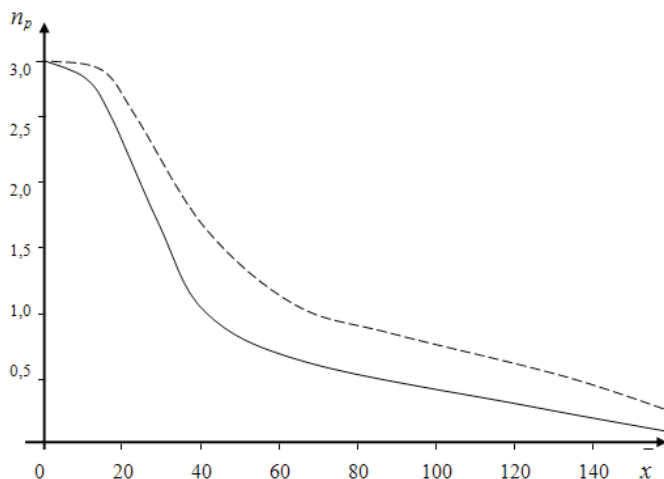


Рис. 2. Зависимости осевых значений счетной концентрации от расстояния сопла ($n_{pz} = 10^9 \text{ м}^{-3}$)

На рис. 2 приведены зависимости осевых значений счетной концентрации дисперсной фазы с учетом (сплошные линии) и без учета (пунктирные) горения частиц. Очевидно, что для рассматриваемых условий учет процесса горения оказывает определяющее воздействие на температуры фаз, а также заметно влияет на счетную концентрацию частиц. Последнее обстоятельство вызвано тем, что, нагрев газа при наличии химической реакции приводит к увеличению поперечной скорости газа, в результате чего уменьшается счетная концентрация частиц на оси струи.

Здесь можно также отметить, что в работе использована однопараметрическая модель турбулентной вязкости, которая адекватно раскрывает физику процесса горения угольных частиц в газовой среде стационарное струйное течение двухфазной среды с учетом химических и фазовых превращений описано уравнениями турбулентного пограничного слоя в континуальном приближении.

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SMART-ТЕХНОЛОГИИ В ОБРАЗОВАНИИ

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Докторант ТГПУ,

Аннотация

В статье рассмотрены SMART-технология, обосновывается необходимость использования SMART-технологий в образовании.

Ключевые слова: SMART, SMART-технология, SMART-образование, Smart e-learning.

Annotation

The article discusses the SMART-technology, justified the need for the use of SMART-technology in education.

Keywords: SMART, SMART-technology, SMART-education, intelligent e-learning.

XXI век – это век, когда информационные технологии становятся неотъемлемой частью жизненного пространства человека. Сегодня с уверенностью можно констатировать факт существования нового цифрового (сетевого) поколения людей, для которых мобильный телефон, компьютер и Интернет являются такими же естественными элементами их жизненного пространства, как природа и общество. Для развития современного образования уже недостаточно влияния человеческого капитала. Необходимо изменять саму образовательную среду, не просто наращивать объёмы образования трудовых ресурсов, должно качественно измениться само содержание образования, его методы, инструменты и среды, необходим всеобщий переход к **SMART** образованию.

Технология **SMART**– современный подход к постановке работающих целей. Система постановки smart – целей позволяет на этапе целеполагания обобщить всю имеющуюся информацию,

установить приемлемые сроки работы, определить достаточность ресурсов, предоставить всем участникам процесса ясные, точные, конкретные задачи.

SMART является аббревиатурой, расшифровка которой: **Specific, Measurable, Achievable, Relevant, Time bound**. Каждая буква аббревиатуры SMART означает критерий эффективности поставленных целей.

Одной из основных задач образования становится формирование современной системы образования на базе **SMART-технологий**, главной целью которой является достижение качественного образования.

SMART-образование представляет собой такую образовательную парадигму, которая предполагает адаптивную реализацию образовательного процесса, возможную на основе использования информационных SMART-технологий.

Реализация парадигмы SMART-образования направлена на формирование процесса обучения и воспита-

Смарт-образование

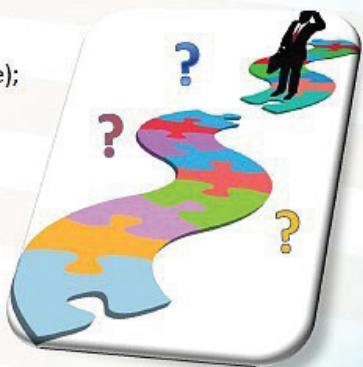
S – Self-Directed (самоуправляемое, самонаправляемое и самоконтролируемое);

M – Motivated (мотивированное);

A – Adaptive (адаптивное, гибкое);

R – Resource-enriched (обогащенное различными, вариативными ресурсами);

T – Technological (технологичное).



ния для приобретения знаний, навыков, умений и компетенций, необходимых для гибкого и адаптивного взаимодействия с изменяющейся социальной, экономической и технологической средой.

SMART-образование должно **обеспечить** возможность использовать преимущества глобального информационного общества для удовлетворения образовательных потребностей и интересов.

SMART-образование – концепция, которая предполагает комплексную модернизацию всех образовательных процессов, а также методов и технологий, используемых в этих процессах, что позволяет по-новому построить процесс разработки контента, его доставки и актуализации.

SMART общество ставит перед университетами новую глобальную за-

дачу: подготовку кадров, обладающих креативным потенциалом, умеющих думать и работать в новом мире. Для этого их надо учить новым практическим навыкам: коммуницировать в соцсетях, отбирать полезную информацию, работать с электронными источниками, составлять личные базы знаний, что требует изменения природ учебного процесса.

SMART обучение реализуется с использованием технологических инноваций и Интернета, который предоставляет студентам возможность приобретения профессиональных компетенций на основе системного многомерного видения и изучения дисциплин с учетом их многоаспектности и непрерывного обновления содержания. Обучение в SMART университете должно быть максимально включенным в жизнь слушателя, но-

сильнейший неформальный характер, а также основываться на технологиях, которые сегодня привычны для всех. Чтобы успевать за происходящими изменениями и растущими запросами студентов SMART университетам необходимо соответствовать следующим требованиям: гибкость, приспособляемость, качественные показатели, инновации. Большое значение приобретают SMART технологии в образовании, с одной стороны позволяя оптимизировать затраты университета на материально-техническое обеспечение, с другой стороны вывести на новый уровень качество образовательных услуг и продуктов.

Необходимо особо подчеркнуть, что для успешной реализации SMART образования в университете научно-педагогическим работникам важно строго соблюдать существующие интеллектуальные технологии его внедрения, которые должны осуществляться с учетом личных требований и предпочтений обучающегося. Для этого необходимо: использовать индивидуальный график обучения, поддерживать постоянный контакт студента с преподавателем, добиваться прочного усвоения знаний, использовать удобное время и место обучения. Интеллектуальные SMART технологии в образовании включают:

1. Образовательные сети (Консорциум электронный университет);
2. Smart e-learning;

3. Качество электронного обучения (E-metrix, стандартизация и сертификация);

4. Быстрый старт.

SMART среда для обучающихся: умные, междисциплинарные, ориентированные на них образовательные системы непрерывного образования (школа, высшее учебное заведение, корпоративное обучение):

- адаптивные образовательные программы, портфолио;
- больше информации об обучающихся;
- технологии совместного обучения – создания знаний;
- доступ к процессу обучения территориально и аппаратно независимый;
- передача большого количества рутинных функций от человека машинам;
- индивидуализация обучения на новом уровне;
- вовлечение в учебный процесс практиков.

Таким образом, наличие высшего качественного образования – необходимое условие адаптации молодого человека к решению широкого класса жизненно важных задач. **SMART** образование позволяет расширить возможности развития личности при решении этих задач в ситуациях меняющегося мира. Именно оно, на наш взгляд, формирует творческий потенциал будущего специалиста, столь необходимый в современных условиях.

