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ABOUT THE ROLE OF INTERESTING ISSUES IN THE STUDY OF MATHEMATICS

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ABSTRACT

Interesting issues are highly effective in teaching mathematics. This article discusses and addresses some interesting issues.

Keywords: Mathematics, issue, problem, science, solution.

Many people think that mathematics is a very difficult science. The application of this science to many of the problems we face in our daily lives and the analysis of its solutions show that the scope of application of the science of mathematics is infinite. It is impossible to study other sciences, all the processes and techniques of nature without understanding the essence of each concept of mathematics. It is not for nothing that mathematics is taught. Therefore, interesting questions are of great importance in order to increase the interest in this science. So, in this article, we will look at the issue of counterfeit coins, which is the most popular for readers.

Issue 1. If one of the 10 bags contains counterfeit coins and a counterfeit coin weighs 4 g and the pure coin weighs 5 g, how can it be determined by weighing it once on a scale?

Solution. 1). Suppose the counterfeit coin is in the 10th bag. If we take 1, 2, 3,… .., 10 coins from each bag, the scales will show: 1 * 5 + 2 * 5 + …… + 9 * 5 + 10 * 4 = 265 g.

2). Suppose the counterfeit coin is in the 9th bag. In this case, the scales: 1 * 5 + 2 * 5 +…. + 9 * 4 + 10 * 5 = 266 g.

Continuing the same process, the scales measure the following weights: 265,266,267, 268, 269, 270, 271, 272, 273, 274.

From this you can find out which bag the counterfeit coin is in. For example, if the scale shows 270 g, the counterfeit coin represents the 5th bag.

Issue 2. If the counterfeit coin in issue 1 is 3g and the pure coin is 4g, which one bag can be used to determine which bag contains counterfeit coins?

Solution. 1). Suppose a counterfeit coin is in the 10th bag. In that case 1, 2, 3,… from each bag. If we take 10 coins and put them on the scales, the scales show the following weights:

1 * 4 + 2 * 4 + 3 * 4 +… + 9 * 4 + 10 * 3 = 210 g.

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2). Suppose the counterfeit coin is in the 9th bag. In this case, the scales show 1 * 4 + 2 * 4 + 3 * 4 +… + 8 * 4 + 9 * 3 + 10 * 4 = 211g.

Continuing the process, we find the following weights:

210, 211, 212, 213, 214, 215, 216, 217, 218, 219.

If, as in the above problems, we define the case where the counterfeit coin is 1 g and the pure coin is 2 g (1; 2), then we get the following sequence of numbers:

(1; 2) 100, 101, 102, 103, 104, 105, 106, 107, 108, 109.

(2; 3) 155, 156, 157, 158, 159, 160, 161, 162, 163, 164.

(3; 4) 210, 211, 212, 213, 214, 215, 216, 217, 218, 219.

(4; 5) 265, 266, 267, 268, 269, 270, 271, 272, 273, 274.

If we look at the series of numbers above, if we add 55 to the numbers in each row, we get the numbers in the next row. For this (5; 6)

We create a sequence of numbers 320, 321, 322, 323, 324, 325, 326, 327, 328, 329. In fact, let's show you how to make a sequence of these numbers.

Issue 3. If one of the 10 bags weighs 5 g and the rest of the bags weigh 6 g, how can a bag of counterfeit coins be identified by a single measurement?

Solution. Let's say the counterfeit coin is in the 10th bag. Then we take 1, 2,3, ..., 10 coins from each bag and put them on the scales: 1 * 6 + 2 * 6 + 3 * 6 +… .9 * 6 + 10 * 5 = 320 shows. If we perform the calculation as above, we actually create a sequence of numbers 320, 321, 322, 323, 324, 325, 326, 327, 328, 329.

Now, if one of the 10 bags has a counterfeit coin weighing n g and the other 9 bags have a coin weight (n + 1) g, how do you find a counterfeit bag using a single measurement?

Given that the difference between the series of numbers from the above problems is 55, we obtain the following formula according to the method of mathematical induction:

(n; n + 1) 45 + 55 n, 46 + 55 n, 47 + 55 n, 48 + 55 n, 49 + 55 n, 50 + 55 n, 51 + 55 n, 52 + 55

n, 53 + 55 n, 54 + 55 n. This formula is suitable for 10 bags. Now suppose we are given 6 bags of coins and one bag contains counterfeit coins. Require a one-time counterfeit coin bag.

We will solve this problem as before. Suppose a counterfeit coin weighs 1 g and a pure coin weighs 2 g. Let's take 1, 2, 3, 4, 5 and 6 coins in each bag. Suppose the counterfeit coin is in the 6th bag. In this case, the weight of the coins is 2 * 1 + 2 * 2 + 2 * 3 + 2 * 4 + 2 * 5 + 1 * 6 = 36g. Suppose the counterfeit coin is in the 5th bag. Then 2 * 1 + 2 * 2 + 2 * 3 + 2 * 4 + 1 * 5 + 2 * 6 = 37g. Continuing this process, we form a sequence of numbers 36, 37, 38, 39, 40, 41 for (1; 2). Now let's do the calculation for (2; 3):

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3 * 1 + 3 * 2 + 3 * 3 + 3 * 4 + 3 * 5 + 2 * 6 = 57,

3 * 1 + 3 * 2 + 3 * 3 + 3 * 4 + 2 * 5 + 3 * 6 = 58,

3 * 1 + 3 * 2 + 3 * 3 + 2 * 4 + 3 * 5 + 3 * 6 = 59,

3 * 1 + 3 * 2 + 2 * 3 + 3 * 4 + 3 * 5 + 3 * 6 = 60,

3 * 1 + 2 * 2 + 3 * 3 + 3 * 4 + 3 * 5 + 3 * 6 = 61,

2 * 1 + 3 * 2 + 3 * 3 + 3 * 4 + 3 * 5 + 3 * 6 = 62.

As a result, we create the following sequence of numbers 57, 58, 59, 60, 61, 62.

From (1; 2) and (2; 3) we find that the difference for the sequence of numbers is 21. In that case we form the following sequence of numbers for (3; 4): 78, 79, 80, 81, 82, 83.

Now we find the sequence of numbers for (n; n + 1):

15 + 21n, 16 + 21n, 17 + 21n, 18 + 21n, 19 + 21n, 20 + 21n.

It is also possible to limit the number of bags in the above issues and to take the difference between counterfeit and pure coins as 2 g, 3 g, etc. In these cases, as in the above, in the form of arithmetic progression, we can give the formula for (n, m). Of course, in these cases, the number of bags, the difference between counterfeit and pure coins must be small natural numbers, because if the difference in coins is large, it can be determined manually. In conclusion, a simple example can help a number of mathematical concepts be formed in the minds of students and increase their interest in science. They reflect the essence of the principle of induction in solving problems.

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OCHIQ KANAL TIZIMLARIDA SUV HAJMINI REAL VAQTDA KUZATISH UCHUN DASTURLAR SOLISHTIRUVI

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Muhammad al-Xorazmiy nomidagi TATU Farg'ona filiali dotsenti

ANNOTATSIYA

Ochiq kanal tizimlarida suv hajmini real vaqt bilan kuzatish maqsadida ko’plab dasturlar ishlab chiqilgan. Ushbu dasturlar gidravlik monitoring vazifasini o’taydi. Maqolamizda ushbu dastur turlari va ularning o’zaro tahlilini qilib o’tamiz.

Kalit so’zlar: Meliorativ, Antropogen omillar, Hec-RAS, . MIKE 11 (DHI),

Ekologik jihatdan monitoring ishlarini olib borish, suv sarfi, hajmi va gidravlik bosimini muntazam o’lchab turish lozim. Butun dunyoda dolzarb bo‘lib borayotgan suv tanqisligining oldini olish, suvdan oqilona foydalanish madaniyatini va suv ishlatish samaradorligini oshirish borasida muhim vazifalar belgilanmoqda.

Xususan, 1,5 ming kilometr yirik kanallarni betonlashtirish, 6 ming 113 ta suv xo‘jaligi ob’ektida suv hisobini real vaqt rejimida kuzatish imkonini beruvchi qurilmalarni o‘rnatish, 2 ming 647 ta meliorativ kuzatuv qudug‘ida sizot suvlari sathi monitoringini avtomatlashtirilgan tizimga o‘tkazish maqsadga muvofiq.

Senatning Agrar va suv xo‘jaligi masalalari qo‘mitasida “O‘zbekiston – 2030” strategiyasini “Yoshlar va biznesni qo‘llab-quvvatlash yili”da amalga oshirishga oid davlat dasturi loyihasi muhokamasi jarayonida yuqorida qayd etilgan masalaga alohida e’tibor qaratildi.

Bu borada davlat dasturi loyihasida joriy yilda paxta va g‘alla ekinlari hosildorligini oshirish, jumladan, paxta hosilini o‘rtacha 45-50, g‘alla bo‘yicha 80-100 sentnerga yetkazish maqsad qilingan.

Ushbu ekinlarning yangi, tezpishar, serhosil navlarini tanlash va joylashtirish, tanlab olingan navlar maydonini har yili kamida o‘n foizga kengaytirib borish darkor. Tejamkor texnologiyalarni ekin maydonlarining 40-50 foizida joriy etish, olimlarni agroklasterlarga biriktirish hamda ilmiy asoslangan tavsiyalar berish, tuproq unumdorligi past bo‘lgan paxta maydonlarida almashlab ekish tizimini kengaytirish zarurligi yuzasidan chora tadbirlash ishlab chiqilayotgani ham bejiz emas.

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Suv bilan bog‘liq eng asosiy muammo – mavjud cheklangan suv resurslarining tobora oshib borayotgan talablarga mos kelmasligi bilan bog‘liqdir. Dunyoda suv xo‘jalik muammolarining asosiy kelib chiqish sabablarini:

1. Sayyorada chuchuk suv zaxiralari o‘ta chegaralangan miqdorda ekanligi;

2. Chegaralangan chuchuk suv resurslarining qit’alar bo‘yicha hududiy jihatdan o‘ta notekis tarqalganligi (buning oqibatida sersuv va kamsuv mintaqalar hosil bo‘lishi);

3. Mavjud, chegaralangan, chuchuk suv resurslardan noto‘g‘ri foydalanish oqibatida (antropogen omillar) ularning ifloslanishi, ya’ni yaroqli holatdan yaroqsiz holatga o‘tib qolishi bilan izohlash mumkin.

Suv resurslarini boshqarish – keng mazmunda suv taqsimotini ta’minlash bilan bog‘liq barcha – siyosiy, huquqiy, ijtimoiy-iqtisodiy, texnik-texnologik va boshqa funksiyalar spektrini, ya’ni suv hokimiyati (boshqaruvi, qarorlar qabul qilish) va suv resurslarini boshqarish (tor mazmunda) tushunchalarini o‘z ichiga oladi. Suv resurslarini boshqarishni aynan suv hokimiyati bosqichida suv xo‘jaligi majmuasi turli ishtirokchilarining faol demokratik ishtiroki ta’minlanadi va qabul qilingan qarorlarning barqaror bo‘lishiga xizmat qiladi. Ikkinchi bosqichda esa, ya’ni suv resurslarini boshqarish (tor mazmunda) bosqichida qabul qilingan qarorlarning ijrosi ta’minlanadi. Shunday qilib, suv resurslarini boshqarish (keng mazmunda) ikki bosqichdan, ya’ni suv hokimiyati (birinchi bosqich) va suv resurslarini boshqarish (tor mazmunda – ikkinchi bosqich)ni o‘z ichiga oluvchi jarayondan iboratdir.

Suv resurslarini (taklifni) boshqarish vazifasi institutsionalga nisbatan ko‘proq injenerlik masalasi hisoblanadi. Suv resurslarini boshqarish – suv xo‘jaligi infratuzilmasini (to‘g‘onlar, suv omborlari, kanallar, kollektorlar va boshq.) yaratish va modernizatsiya qilishga ko‘proq urg‘u beriladigan tuzilmaviy (texnik) yondashuv bilan xarakterlanadi. Suv xo‘jaligi rivojining dastlabki bosqichlarida iqtisodiy tizimning turidan qat’i nazar odatda ko‘proq suv resurslarini boshqarishga urg‘u beriladi.

Quyida suv hajmini real vaqtda kuzatish uchun ishlatiladigan dasturlarni solishtirgan holda ko’rib chiqamiz.

Hec-RAS (Hydrologic Engineering Center's River Analysis System)- HEC-RAS — bu Amerika Qo'shma Shtatlari Armiya Muhandislik Korpusining (USACE) ishlab chiqargan dasturidir. Bu dastur suv oqimi, gidravlik hisob-kitoblar va ochiq kanal tizimlaridagi turli gidravlik parametrlarni tahlil qilish imkonini beradi.

Bu dasturning quidagicha avzalliklari mavjud:

Ko'p funktsional: Gidravlik va gidrologik modellash, suv oqimi simulyatsiyasi, toshqinlarni prognozlash.

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Ochiq kanal tizimlari uchun mos: Daryo va kanallarda suv oqimini simulyatsiya qilishda qo'llaniladi.

Real vaqtda kuzatish imkoniyatlari: HEC-RAS modellarini real vaqt tizimlari bilan integratsiya qilish mumkin, lekin qo'shimcha tizimlar talab qilinadi.

Garchi Hec-RAS dasturining avzalliklari ko’p bo’lsada, kamchiliklardan holi deb bo’lmaydi. Murakkablik: Boshlang'ich foydalanuvchilar uchun o'rganish qiyin bo'lishi mumkin.

2. MIKE 11 (DHI)- (Danish Hydraulic Institute) tomonidan ishlab chiqilgan va ochiq kanal tizimlarida gidravlik simulyatsiyalarni amalga oshiruvchi dasturdir. Suv oqimi, toshqinlar va suv resurslarini boshqarish bo'yicha yuqori aniqlikdagi modellarni taqdim etadi.

Afzalliklari: Yuqori aniqlikdagi tahlillar: Real vaqt kuzatuvi va dinamik simulyatsiyalar uchun yuqori samarali.

Moslashuvchanlik: Ochiq kanal tizimlari, daryolar, kanal tizimlari va boshqa suv resurslari uchun keng qamrovli yechimlar taqdim etadi.

Interfeysi qulay: Foydalanuvchilar uchun oddiy interfeys va intuitiv dizayn.

Kamchiliklari:

Litsenziya narxi: MIKE 11 nisbatan yuqori litsenziya narxiga ega. Texnik ko'nikmalarni talab qiladi: Dasturda ishlash uchun ba'zi texnik bilimlar zarur.

3. SWMM (Storm Water Management Model)— AQSh Atrof-muhitni himoya qilish agentligi (EPA) tomonidan ishlab chiqilgan va ochiq kanal tizimlarida, kanalizatsiya tizimlarida va yomg'ir suvlari boshqaruvi uchun ishlatiladigan dastur.

Afzalliklari:

Erkin va ochiq kod: SWMM bepul va ochiq manba kodli dastur bo'lib, ko'plab foydalanuvchilar va jamoalar tomonidan qo'llaniladi.

Yengil o'rganish: Boshlang'ich foydalanuvchilar uchun oson o'rganish va foydalanish.

Real vaqt monitoringi: SWMM tizimlari real vaqt rejimida suv oqimini kuzatish uchun ishlatilishi mumkin.

Kamchiliklari:

Cheklangan parametrlar: Asosan yomg'ir suvlarini boshqarishga mo'ljallangan, lekin ochiq kanal tizimlaridagi boshqaruvda ba'zi cheklovlarga ega.

Aniqlik: Gidravlik simulyatsiyalar va tahlillar MIKE 11 yoki HEC-RAS bilan taqqoslaganda kamroq aniqlik keltirishi mumkin.

4. OpenChannelFlow— bu ochiq kanal tizimlarida suv oqimi va gidravlik tahlil uchun mo'ljallangan ochiq manba dasturidir. Suv hajmi va oqim parametrlarini aniqlashda ishlatiladi.

Afzalliklari:

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Ochiq manba: Bepul va jamoa tomonidan qo'llab-quvvatlanadi.

Ko'p turdagi simulyatsiyalar: Suv oqimi, gidravlik hisob-kitoblar va kanal tarmoqlarida ishlash uchun mos.

Kengaytiriladigan: Dasturga qo'shimcha modullar va funksiyalar qo'shish mumkin.

Kamchiliklari:

Cheklangan qo'llab-quvvatlash: OpenChannelFlow dasturi o'zgartirish va qo'llab-quvvatlashda nisbatan cheklangan, bu ba'zida foydalanuvchilar uchun muammo tug'dirishi mumkin.

5. Aquaveo (Surface Water Modeling System)— suv resurslari boshqaruvi va gidravlik simulyatsiyalar uchun keng qamrovli tizim bo'lib, ochiq kanal tizimlarida ham ishlatiladi. Dastur simulyatsiyalar va monitoring uchun bir nechta modellarni birlashtiradi.

Afzalliklari:

Yuqori darajadagi integratsiya: Turli xil modellarni birlashtirish va ularga asoslangan tizimlar yaratish.

Moslashuvchan: Real vaqt monitoringi uchun yaxshi variantlar taklif etadi.

Kamchiliklari:

Narxi: Litsenziya narxi boshqa dasturlarga qaraganda yuqori bo'lishi mumkin. Murakkablik: Foydalanish uchun yuqori darajada bilim va tajriba talab etiladi.

Xulosa: Eng qulay va bepul variant: SWMM — boshlang'ich foydalanuvchilar uchun yengil va bepul yechim. Ammo, agar siz yuqori aniqlikdagi gidravlik tahlillarni talab qilsangiz, HEC-RAS yoki MIKE 11 dasturlari yaxshiroq bo'ladi.

Ko'p funktsional va moslashuvchan: MIKE 11 — yuqori darajadagi tahlillar va real vaqt monitoringini talab qiladigan foydalanuvchilar uchun eng yaxshi tanlov bo'lishi mumkin.

Ochiq manba va yengil foydalanish: OpenChannelFlow yoki Aquaveo foydalanuvchilari uchun yaxshi alternativa bo'lishi mumkin.

Har bir dastur o'zining afzalliklari va kamchiliklariga ega, shuning uchun sizning ehtiyojlaringizga mos keladiganini tanlash muhimdir.

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QISHLOQ XO'JALIGI KANALLARIDA SUV ISTE'MOLINI KUZATISH UCHUN INNAVATSION TEXNOLOGIYALAR

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ANNOTATSIYA

Qishloq xo’jaligi kanallarida suv iste’molini kuzatish va boshqarish bugungi kunda juda muhim ahamiyatga ega. Suv resurslari cheklangan va iqlim o’zgarishi kabi omillar tufayli samarali suvni boshqarish, qishloq xo'jaligi ekinlarini sug'orish, suv ta'minoti va oqimlarni optimallashtirish uchun innovatsion texnologiyalarni joriy etish zarur.

Kalit so’zlar: Avg’oniston, ekin maydonlari, . IoT, dronlar, GIS, Avtomatik boshqaruv tizimlari

So‘nggi vaqtlarda nafaqat mamlakatimizda, balki Markaziy Osiyo davlatlarida suv tanqisligi muammosi yildan-yilga jiddiy tus olmoqda. Yurtimiz iqtisodiyotining yetakchi tarmoqlaridan biri bo‘lgan qishloq xo‘jaligida esa suvning o‘rnini hech narsa bilan o‘lchab bo‘lmaydi. Chunki mamlakatimiz hududidagi sug‘oriladigan ekin maydonlari 4 million 300 ming gektarni tashkil etadi. Bu esa kelgusida suv bilan bog’liq jiddiy muammolarni kelib chiqishiga sabab bo’ladi.

Yurtimizdagi ichki daryolar qishloq xo‘jaligidagi suvga bo‘lgan ehtiyojimizni qondira olmasligini hammamiz yaxshi bilamiz. O‘zbekiston ichki daryolarining o‘rtacha ko‘p yillik suv resurslari 11,5 ming m^3 bo‘lib, bu respublika suv ehtiyoji umumiy miqdorining 18 foizini tashkil qiladi. Transchegaraviy daryolar hisoblangan Amudaryo va Sirdaryo o‘zanidagi suv manbai esa qo‘shni davlatlar hududida. Sirdaryo Qirg‘izistondan, Amudaryo esa Afg‘oniston va Tojikistondan boshlanadi. Bu daryolarning suvi xalqaro kelishuvlarga ko‘ra, asosan Markaziy Osiyo davlatlari va Afg‘oniston orasida taqsimlanadi. Bu har yili suvning qanday shakllanishiga bog‘liq.

Suv olish tarmoqlarimizning o‘zidayoq yo‘qotilayotgan suv hajmi juda katta. Umumiy suv hajmining 40 foizgacha bo‘lgan qismi kanallar va ariqlarda filtratsiya (suvning yerga singib ketishi), bug‘lanish, maqsadsiz oqib ketish jarayonida yo‘qotiladi. Chunki bizda kanallarning bor-yo‘g‘i 12 yoki 15%i betonlashtirilgan. Bundan tashqari hududlarda ko‘p suv talab qiladigan ekinlar ekilishi ham mavjud vaziyatni yanada og‘irlashtiradi.

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O‘zbekiston qishloq xo‘jaligida yil davomida 39 mlrd kub metr suv iste’mol qilingan. Shundan 36 foizi yoki 14 mlrd kub metri tuproq o‘zanli kanal va ariqlarda yo‘qolgan, dedi prezident. Yana 5−6 mlrd kub metr suv sug‘orishning eskirgan usullari tufayli yo‘qotilmoqda. O‘tgan yili O‘zbekiston qishloq xo‘jaligida 39 milliard kub metr suv sarf etildi. Shundan 36 foizi, ya’ni 14 milliard kub metrdan ortig‘i tuproq o‘zanli kanal va ariqlarda yo‘qolgan. Bu haqda Shavkat Mirziyoyev juma kuni bo‘lib o‘tgan yig‘ilishda ma’lum qildi. Davlat rahbari suv resurslari bilan bog‘liq muammolarning dolzarbligi kundan-kunga ortib borayotganini alohida ta’kidladi, deb xabar bermoqda uning matbuot kotibi Sherzod Asadov. Shu bilan birga, so‘nggi ikki yilda suv xo‘jaligiga, jumladan, suvni tejovchi texnologiyalarni joriy etish maqsadida katta miqdorda subsidiyalar ajratildi.

Yerlarning 70 foizi eski usulda sug‘orilgani bois 5−6 milliard kub metr suv behuda sarflanib, kollektorlarga tashlanmoqda, dedi prezident.

Bugungi kunda 2,5 million gektar maydonni sug‘orish uchun 5 mingdan ziyod nasos ishlatilib, yiliga 7 milliard kilovatt soat elektr sarflanadi. Lekin 80 foiz nasoslar 35−40 yildan beri ishlatilib, o‘z resursini o‘tab bo‘lgan, dedi Shavkat Mirziyoyev.

Sohani isloh qilish maqsadida bir necha texnologiyalar ishlab chiqilgan bo’lib, quyida qishloq xo'jaligi kanallarida suv iste'molini kuzatish uchun ishlatiladigan ba'zi innovatsion texnologiyalarni ko'rib chiqamiz:

1. IoT (Internet of Things) Asosida Suv Monitoring Tizimlari texnologiyalari yordamida suv manbalarini va kanallarda suv oqimini real vaqtda kuzatish mumkin. IoT sensorlari kanallar va sug'orish tizimlariga joylashtiriladi, ular suvning darajasi, oqimi, harorati va boshqa parametrlarni real vaqtda o'lchaydi va bu ma'lumotlarni markaziy tizimga yuboradi. Bu tizimning avzalliklari real vaqtda monitoring qila olishi, suvning holati va oqimi har doim nazoratda bo'ladi. Masofaviy boshqaruvning imkoni borligi istalgan ob havoda ham bir punktdan turib tizimni boshqarishga yordam beradi. Foydalanuvchilar mobil telefonlar yoki kompyuterlar orqali tizimni boshqarishlari mumkin. Avtomatlashtirish imkoniyati borligi esa bu tizimni yanada qulaylashtiradi. Suv manbalarining holati va suv iste'moli avtomatik ravishda boshqarilishi mumkin, bu esa resurslarni tejashga yordam beradi.

2. Dronlar va UAV (Unmanned Aerial Vehicles) yordamida Suv Monitoring qishloq xo'jaligi tarmoqlarida ekinlarni kuzatish va suv resurslarini boshqarishda samarali ishlatiladi. Dronlar yordamida yer usti va yer osti suv resurslarini kuzatish, kanallardagi suv oqimini aniqlash va sug'orish samaradorligini oshirish mumkin. Tizimning avzalliklaridan biri tez va aniq ma'lumotlar olishga imkon berishi - dronlar keng maydonlarni tezda qamrab oladi va yuqori aniqlikdagi tasvirlar yordamida kanallardagi holatlarni o'rganadi. Tizim dronlar yordamida

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foydalanishga ham mo’ljallanganligi bois boshqaruvni osonlashtiradi. Dronlar ko'p miqdordagi ma'lumotlarni bir vaqtning o'zida yig'ib, analitik vositalar orqali tahlil qilishni osonlashtiradi.

3. Sun'iy Intellekt va Mashina O'qitish texnologiyalari yordamida, qishloq xo'jaligida sug'orish tizimlaridan optimal foydalanuvchi modellar va prognozlar ishlab chiqilishi mumkin. Suv iste'molini taqsimlash va boshqarish uchun AI tizimlari real vaqtda o'zgaruvchan iqlim sharoitlariga, yerning suvga bo'lgan ehtiyoji va boshqa omillarga asoslanib qarorlar qabul qiladi. Tizimning suv iste'molini optimallashtirish, AI yordamida sug'orish va suv ta'minotini ma'lumotlarga asoslangan ravishda samarali boshqarish, Prognozlash- Iqlim sharoitlari va o'simliklarning o'sish bosqichiga qarab, sug'orish va suv ta'minotini oldindan prognoz qilish kabi avzalliklari mavjud.

4. GIS (Geografik Axborot Tizimlari) va Remote Sensing (Masofaviy Zondlash) GIS va masofaviy zondlash texnologiyalari yordamida qishloq xo'jaligi kanallarining va ularning atrofidagi erlarning holatini doimiy ravishda kuzatib borish mumkin. Bu texnologiyalar suv resurslarini samarali boshqarish, ekinlar va sug'orish tizimlarining samaradorligini baholashda yordam beradi. Keng qamrovli tahlil qilish GIS tizimida juda qulay, GIS va masofaviy zondlash orqali kanal tizimlarining va butun ekin maydonlarining holatini tekshirish imkoni mavjud. Aniq xaritalar va tahlillar qilish uchun GIS dasturida qulay funksiyalar mavjud, suv oqimining yo'nalishlarini, yuqori va past suv darajalarini ko'rsatuvchi xaritalarni yaratishda avzalliklarini alohida takidlab o’tishimiz mumkin.

5. Avtomatik Suv O'lchov va Boshqaruv Tizimlari - Avtomatik tizimlar kanal va suv manbalarida o'zgarishlarni aniq o'lchaydi va shunga qarab sug'orishni avtomatik ravishda boshqaradi. Bu tizimlar kanal bo'yidagi suv sathini, oqim tezligini va boshqa parametrlarni nazorat qiladi va bu ma'lumotlarni markaziy tizimga uzatadi. Tizim yuqori aniqlikdagi o'lchovlar olish maqsadida va suvning o'lchovlari va kanal tizimlaridagi holat aniq va avtomatik ravishda o'lchashda qulay. Tezkor reaksiyada ishlay olishi tizimni yanada qulaylashtiradi, suvning holati o'zgarishlarga mos ravishda tizim avtomatik tarzda ishlaydi.

Xulosa:

Qishloq xo'jaligi kanallarida suv iste'molini kuzatish uchun innovatsion texnologiyalarning keng qo'llanilishi suv resurslarini boshqarishni yanada samarali qilishga yordam beradi. IoT sensorlar, dronlar, AI tizimlari, GIS va masofaviy zondlash kabi texnologiyalar qishloq xo'jaligida suvni tejash, sug'orishning samaradorligini oshirish va ekologik xavflarni kamaytirish uchun muhim vositalar hisoblanadi. Bu texnologiyalar orqali qishloq xo'jaligi sektori barqaror rivojlanishga erishishi va suv resurslaridan optimal foydalanishi mumkin.

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МОДИФИКАЦИЯ И КРАШЕНИЯ ПАН-ВОЛОКНА

Султонова Н., Хасанова С.Х.

АННОТАЦИЯ

Данная статья посвящена изучению процесса модификации полиакрилонитрильного волокна раствором поливинилового спирта. Установлено оптимальное соотношение ПАН и ПВС. Показано возможность колорирования модифицированного волокна водорастворимыми красителями.

Ключевые слова: объем, синтетические волокна, энергетических ресурсов, влажности воздуха

Увеличение объема выпуска высококачественных полимеров с заданными техническими характеристиками, включая синтетические волокна, относится к числу основных задач экономического и социального развития нашей страны на долгосрочный период. Производство синтетических материалов обусловлено относительной дешевизной исходного сырья, меньшими затратами материальных, трудовых и энергетических ресурсов, чем на производство того же количества природных материалов, несложной технологией их производства.

Как известно, первые полиакрилонитрильные волокна отличались отсутствием активных центров для сорбции красителей, высокой плотностью структуры, высокой температурой стеклования (T_R=104°C), значительной гидрофобностью (1-2% влажности при 65% относительной влажности воздуха) и, как следствие, исключительной инертностью по отношению ко всем классам красителей. Однако введением в структуру сомономеров кислотного характера - итаконовая и метакриловая кислоты было достигнуто колорирование волокна катионными красителями. Кроме этого введением сомономеров винилового ряда можно целенаправленно изменять следующие свойства нитронового волокна: разрыхлять структуру полимера за счет объемных радикалов; снижать температуру стеклования полимера за счет снижения суммарной энергии межмолекулярного взаимодействия в аморфных областях; повышать гидрофильность и, следовательно, смачиваемость и влагопоглощение волокон; вводить ионогенные группы, как активные центры для сорбции ионогенных красителей [1]. Кроме того, содержание в гидрофобном полимере, как полиакрилонитрил, небольшого количества ОН групп позволит повысить гидрофильность, адгезионные характеристики, обрабатываемость, электростатические характеристики.

В данной работе изучена возможность модификации нитронового волокна поливиниловым спиртом (ПВС). Выбор растворителя для ПВС сложен, в связи ограниченным количеством органических растворителей. Однако в ряде работ показано [2], что апротонные растворители, как например, диметисульфоксид (ДМСО), является подходящим для ПВС, в растворе ДМСО поливиниловый спирт находится молекулярно-диспергированным состоянии и как следствие – не подвержен к старению, из которого можно сделать вывод, что ДМСО является хорошим растворителем для ПВС с термодинамической точки зрения.

Первоначально был приготовлен 5%-ный раствор поливинилового спирта в диметисульфоксиде, который вводили в прядильный раствор нитрона при соотношении 10:90, 15:85, 20:80 [3]. Путем интенсивного перемешивания был получен однородный

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прядильный раствор. Формование волокна по мокрому способу проводилось на малой лабораторной установке (МУЛ). В качестве осадительной ванны использовали водный раствор диметилформамида. Полученные волокна промывали в дистиллированной воде. В результате проведенных работ было выявлено наиболее благоприятное соотношение прядильного раствора на основе ПАН и ПВС равным 10:90 [4]. Физико-механические показатели модифицированного и немодифиицированного ПАН-волокна представлены в таблице 1.

Таблица 1

Физико-механические показали ПАН-волокон

Наименование волокна	Физико-механические показали				
	Удлинения, %	Макс. уд.,%	Макс.разрыв. нагрузка, cN	Удельн. раз. нагрузка, cN/tex	Линейная плотность, tex
Немодифицированный ПАН	8	4	300	32	30
Модифицированный ПАН	2,76	2,81	271,36	11,31	24

Как видно из таблицы 1 модифицированное ПАН-волокно обладает менее высокими физико-механическими показателями по сравнению немодифицированным.

На следующем этапе исследований было проведено крашение модифицированного волокна нитрон водорастворимыми красителями, как прямые и активные. В целях повышения насыщенности окраски было изучено влияние концентрации красителя в пределе от 1 до 4% от массы волокна (таблица 2).

Таблица 2

Влияние концентрации красителя на колористические и прочностные показатели модифицированного ПАН-волокна

Концентрация красителя, %	Интенсивность цвета, K/S		Прочность окраски к мылу, баллы	
	активный алый	прямой бордо	активный алый	прямой бордо
1	1,9	1,8	5\5/5	5\4\4
2	2,1	2,0	5\5\4	4\5/4
3	2,4	2,2	4/5\5	4/4/4
4	2,8	2,4	4/4/3	3/4/3

Как видно из таблицы 2 с увеличением количества красителя в красильной ванне наблюдается повышение интенсивности цвета, как при крашении активными, так и прямыми, незначительным превалированием активного, однако при этом прочность

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окраски к мыльной обработки в обеих случаях снижается и в большей степени в случае прямого красителя. Таким образом, дополнительное введение гидроксильных групп в структуру полимера в процессе приготовления прядильного раствора с последующим формованием из него волокна, дало возможность окрашивать гидрофобное ПАН волокно водорастворимыми красителями.

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A HISTORICAL ANALYSIS OF RELIGIOUS AND CULTURAL INTERACTIONS of TAMERLANE AND THE JEWS COMMUNITIES

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ABSTRACT

This article examines the book "Tamerlane and the Jews" by Michael Shterenshis analyzing the fourteenth-century ruler Tamerlane's relations with the Jews people and how the policy of Tamerlane influenced on the Jews life and their culture in Central Asia. The analysis gives insights and information that Tamerlane had a great impact on different communities especially Jews which was under his reign that period.

Keywords: Tamerlane, Jews, Central Asia, 1400s, interfaith relations, Jewish communities, impact, culture, Samarkand

Introduction

Few figures in the history of Central Asia are as notorious as Tamerlane (Timur), the fourteenth-century overlord of an empire which ran from the banks of the Volga River to the Ganges. Although he has left behind a legacy characterized by his military conquests and centralization of authority, Tamerlane's life and times were also marked by dialogues between religions, as well as the interplay of cultures. This included looking into the Jewish communities whose pasts provide rare opportunities to help investigate the era of Tamerlane.

Although Tamerlane is widely portrayed by historians as a cruel conqueror and a calculating politician, his connection with the reigning Jewish communities of Central Asia has seemed as a less-discussed facet of his dominion (Shterenshis, 2002). This study explores the treatment of Tamerlane (Tamerlane the Great) among his Jewish subjects, and how his policies affected their communities, their freedom of religion and the development of their culture. Employing both historical and legendary narratives, the book clarifies the gentle considerations for the Jewish people that were available under Tamerlane, uncovering wider models of religious strife and tolerance somewhere in the range of medieval Asia.

Literature Review and Research Methodology

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Tamerlane's relations with Jews are only proposed by the primary and secondary sources both associated with Jewish and Islamic civilizations. Jewish history in Central Asia during the empires of Tamerlane is one of the comparatively few topics covered by Michael Shterenshis's *Tamerlane and the Jews*. Other sources include the writings of early Jewish travelers, such as Benjamin of Tudela and Rabbi Petachia of Ratisbon, whose settlements in the pre-Tarski period, though Zimmerman, give background of the Jewish occupation of Central Asia.

For this research, historical scholarship is fused with a historical method; both deductive and qualitative methods of archival analysis and discursive historical analysis are employed. This framework yields insight into a more detailed description of Tamerlane's policies, the impact of his religion, and the historical context of the Jewish community in his Holy state. Important historical figures such as Miranshah and Sa'd ad-Daula ibn as-Safi, Tamerlane's son, and his counselor respectively are crucial elements in studying the interfaith relations of the period in question.

Discussion

Background: Jewish Presence in Central Asia

Central Asia, particularly Bukhara and Samarkand, had several Jewish populations who were part of a much wider diasporic movement that spread across the Middle East and Persia and even beyond. Jewish communities in Central Asia are believed to be of ancient origin since historians believe they were part of the migration of the Ten Lost Tribes. By the fourteenth century, Central Asian Jews had already penetrated the area with merchants, healers, and men of culture.

Before the emergence of Tamerlane, Jews settled in various parts of Asia and lived under the dictates of local rulers and their aptitude toward religious minorities. Within Islamic empires, as dhimmi (non-Muslim subjects with protection), the Jews could enjoy some practices and was given a limited caste status. This changed with the arrival of Tamerlane, as he started formulating his own policies over Jews and other minorities.

Tamerlane's Religious Policies and Jewish Communities

His views and practices regarding religions are largely determined by his Muslim background though a lot of things Tamerlane did when ruling were based on common sense. He called himself a pious Muslim but too often acted selfish for political reasons. His empire encompassed all of the cultures and religions – Islam, Christianity, Buddhism, Judaism. It was Tamerlane's aim to blend such different peoples into one whilst in his particular dominion. At times, he used religion for the purpose of bringing the people together politically.

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The inhabitants of Jewish communities, however, had a rather complicated allegiance to the ruler. Historical sources bring contradicting images of the even-tempered Tamerlane with the Jews. On one hand, he has been identified as a protector who extended privileges to the Jewish population in centers like Bukhara. As an example, one Jewish traveler had it that Temerlen deployed Jews as trusted advisors and gave them titles like Shenee-lamelek which means second to the king introducing a Jewish adviser from Germany. Some, however, reported that Tamerley was not friendly to the Jews but destructive, even burning and looting their religious centers.

In quite a different context, one episode comes from Mignanelli's *Vita Tamerlani* in which Tamerlane is said to have had some soldiers posing as Jews who entered a synagogue, slaughtered its worshippers and plundered its treasury (Mignanelli, 1416). This account, whilst probably embellished, reveals how volatile Jewish existence was under the rule of someone as erratic as Tamerlane. The last two images are poles apart yet they both reveal a fair amount of contradictions in the practice of Tamerlane's policies which sought to be tolerant yet exploitative at the same time.

Comparative Analysis: Tamerlane and Other Rulers' Attitudes Toward Jews

When discussing Tamerlane in the context of Central Asia and Islam, both similarities, and differences arise. Regularly, Tamerlane appreciated religious minorities within his empire as contributing economically and intellectually to the region. Trade was dominantly practiced by the Jewish communities, and Tamerlane fostered the inflow of luxury commodities and medical practices into his cities for their growth.

No consideration was accorded to the practices of the Ottoman Sultan Bayezid or the Mamluk Sultans. In many cases, for example, Tamerlane's strategy was less restrained; he often vacillated between appeasement and aggression. This contradiction, perhaps, can originate from the fact that he regarded Jewry not only as an important asset but also as a possible danger. The Ottoman and Mamluk powers, as a rule, tended to operate within the parameters of established Sunni Islamic legal codes, which was not the case with Tamerlane's rule, which was highly personalized in principle, with decisions being made solely according to Tamerlane's views.

Analysis of Tamerlane's Policies through the Lens of Interfaith Relations

Such a reign therefore clearly stands as a determinative model of practical interfaith relations. Often enough, Jewish communities felt secure in the arms of Tamerlane's empire, while the same was characterized as being contingent on the ephemerality of political objectives. A case of this inclusiveness could be seen in scenes such as that of Samarkand, where Tamerlane extended religious tolerance to attract the labor of artisans, scholars, and traders. This enabled both Jewish and Christian communities to progress within the economic orbit of the empire.

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Yet, this tolerance was reined in by terrible reprisals against groups seen as potential rivals or dissenters. In some cases, Tamerlane's campaigns involved attacks on certain Jewish populations accused of resisting his authority. To hold absolute control, sometimes policies that could practically make those groups' social autonomy irrelevant were employed, thus illustrating the limits to toleration in this centralized power regime.

Jewish Cultural and Religious Life under Tamerlane

Despite this challenging environment, Jewish communities in Tamerlane's empire enjoyed periods of relative autonomy and cultural advancement. This period saw the extension and enrichment of Jewish traditions across Central Asia. Both the Torah and Talmud were studied in synagogues, while Hebrew continued as the written language of worship and scholarship.

The Jewish community in Samarkand benefitted immensely from Tamerlane's great architectural projects, increasing the city's weight as a cultural and intellectual clearance for food. Jewish artisans participated in the building of erecting buildings; synagogues, markets, and installations, positioning themselves in the nexus of the city's economy. However, this participation rarely received recognition, as Jewish communities remained discreet out of fear of incurring the displeasure of the authorities.

Legends and Myths: Tamerlane's Perception in Jewish Memory

This complex dual image of Tamerlane as both protector and persecutor exists in Jewish memory and so has created a unique and memorable historical legacy. His stories of tolerance, such as that he granted Jews asylum in his home city of Samarkand, sit alongside accounts of massacres. The conflicting stories hint at the larger historical picture for medieval Jewry across much of Asia, where the fates of local populations were often left at the mercy of local monarch.

In Jewish folklore, Tamerlane was remembered as a historical myth, a legendary figure to whom many stories have attached, as a ruthless enemy but also a potential ally. This duality mirrors a more general theme of how Jewish rulers often are remembered as playing perhaps either a functional, structural role or a spiritual, historical role (or both) in Jewish life—how they simultaneously served other functions in Jewish life.

Results

Exploring the role and relations of Tamerlane vis-a`-vis Jewish communities of his days reveals how with his arrival a new phase of consolidation and survival began for the Jews of Central Asia. This analysis suggests that, although Tamerlane imposed relentless hardship on their lives, his policies also opened opportunities for Jewish cultural preservation and economic

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involvement. His empire was a politically volatile environment, but Jewish communities found a way to coexist cheerfully and effectively in this.

These findings further highlight that many episodes of violence within Tamerlane's legacy do not comprise Tamerlane's legacy through and through — they are simply part of it. His policies were erratic, but for all of them they gave Jewish communities some degree of protection and the chance to make a living, especially in cosmopolitan cities like Samarkand.

Conclusion

Tamerlane holds a unique place in the oppressed histories of Central Asia, but his potential as a figure representing religious fork of political pragmatism to a medieval empire should not be overlooked, especially with regard to the way he treated Jewish communities within the same. His reign exemplifies the malleability of interfaith relations, showing us a world in which the preservation of culture frequently occurred at the behest of national expedience. The policies that Tamerlane pursued swung between tolerance and a certain level of coercion, a reflection of both the diversity of his empire and of the limits of his rule.

Through its focus on relatively high profiles Jews in medieval society while unsuccessfully pursuing papacy this study brings us closer to our understanding of how minority communities, and those faced by complicated political landscapes, lived through that time. Under certain conditions, Jewish communities managed to grow despite the difficulties that Tamerlane implemented during his reign. All in all, investigating how other communities developed under the reign of Tamerlane is an important area for future study.

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КАК САМОСТОЯТЕЛЬНО ИЗУЧАТЬ ИНОСТРАННЫЙ ЯЗЫК?

КИМ СВЕТЛАНА ТЕРЕНТЬЕВНА
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Аннотация

Благодаря упорному труду и целеустремленности любой студент сможет преодолеть любые трудности при самостоятельном изучении иностранного языка. Поддерживайте свою мотивацию на высоком уровне и напоминайте себе, почему вы хотите изучать английский. В данной статье желающие изучать языки самостоятельно получат много разных советов. Наиболее значимое, вы становитесь менее зависимыми от других в изучении иностранного языка. Поскольку вы учитесь в одиночку, у вас больше мотивации доказать, что вы можете выучить иностранный самостоятельно.

Ключевые слова: учатся в одиночку, радиостанциях, видеообзор, субтитры, перебивать друг друга

Многие изучающие английский язык нервничают из-за того, что учатся в одиночку.

К счастью, все необходимые вам ресурсы можно найти дома.

Правда в том, что Интернет - это не только ваш лучший источник для изучения английского языка, но и самый простой способ заниматься дома в любое удобное для вас время.

И вам не нужно все время оставаться дома, чтобы заниматься. Как только у вас появятся необходимые ресурсы, вы сможете взять их с собой и учиться там, где захотите.

Самое приятное то, что вы также можете заниматься в своем собственном темпе, не следуя инструкциям преподавателя и не беспокоясь о том, что не успеваете за своими одноклассниками. Поскольку вы учитесь в комфортном темпе, это становится для вас более эффективным процессом обучения.

Наиболее значимое, вы становитесь менее зависимыми от других в изучении английского языка. Поскольку вы учитесь в одиночку, у вас больше мотивации доказать, что вы можете выучить английский самостоятельно. Пока вы можете сохранять мотивацию, есть хороший шанс, что вы добьетесь успеха.

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Вот несколько способов получить мотивацию при самостоятельном изучении английского языка

Итак, с чего вы начинаете свое путешествие по самообучению?

Во-первых, вы должны выбрать метод, который вам удобен и в то же время доставляет удовольствие. Это помогает повысить вашу мотивацию до тех пор, пока вы не будете готовы использовать другие подходы к самостоятельному изучению английского языка.

- Послушайте музыку и выучите все тексты песен.

Чтобы выучить английский язык по вашей любимой музыке, вы должны придерживаться английских песен и извлекать из них уроки следующим образом.

• Потренируйтесь с вашими любимыми песнями или с популярными композициями. Второй вариант лучше, потому что вы слышите, как они играют, куда бы вы ни пошли. Вы также можете послушать их на английских радиостанциях онлайн. Что касается жанра (типа) музыки, вы, возможно, захотите избегать рока и рэпа (если только вы не продвинутый ученик), потому что тексты часто слишком быстрые или их трудно расслышать.

• Зайдите на YouTube и найдите музыкальное видео или аудиофайл, который вам нравится. Слушайте ее снова и снова, пока не узнаете песню очень хорошо. После этого найдите текстовую версию песни. Все, что вам нужно сделать, это ввести полное название песни, имя исполнителя (если вы знаете, кто это) и слово "текст песни". Текст песни покажет вам все слова на экране. Если возможно, найдите официальное видео с текстами песен (это означает, что они на самом деле созданы оригинальным певцом или исполнителем), чтобы вы знали, что все слова песни верны.

• Попробуйте спеть эту песню. Как только вы запомните текст и хорошо почувствуете музыку, вы можете попробовать исполнить версию песни а капелла (без музыки) или караоке-версию (только музыка).

- Смотрите видео на английском языке о ваших интересах.

Теперь, когда вы находитесь на YouTube, вы также можете попробовать смотреть немузыкальные клипы. Таким образом, вы можете тренировать свое понимание английского языка на слух и улучшить свой разговорный английский (то, как вы разговариваете с другими носителями английского языка).

Вы можете наблюдать:

• Отзывы. Например, вы можете посмотреть технологический радиостанциях о конкретной модели, например, обзор Apple iPhone 11 от The Verge.

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• Интервью. Если вам нравятся фильмы, вы можете посмотреть интервью с вашими любимыми актерами и актрисами, например, интервью Роберта Дауни-младшего для фильма "Мстители: Эра Альтрона". Ничего страшного, если интервью немного устарело, при условии, что вы слушаете настоящий контент на английском языке.

• Видеоролики на FluentU. С помощью видеороликов FluentU вы можете выбрать все, что хотите посмотреть, и использовать интерактивные субтитры, чтобы улучшить свой словарный запас, аудирование, произношение и беглость речи. Используйте функцию "цикл" для повторения частей видео, которые вы не понимаете. Сделайте свое самообучение более "активным" с помощью практики слежки, интерактивных карточек и списков словарного запаса.

- Смотрите фильмы и телепередачи на английском языке.

Просмотр фильмов и телепередач на английском языке также поможет вам улучшить свою речь и понимание.

Если вы посмотрите более свежие передачи, то сможете услышать, как англоговорящие люди разговаривают друг с другом на современном английском. Это поможет вам выучить жаргонные термины (например, в США), идиомы и словосочетания, а также расширить свой словарный запас английского языка.

В случае, если вы не понимаете, о чем идет речь, вы можете:

• Используйте субтитры. Как только вы освоитесь с тем, что говорится, уберите субтитры и посмотрите еще раз.

• Практикуйтесь в строках столько, сколько сможете. Если вы не понимаете текст, вы всегда можете найти расшифровку (письменную версию аудиозаписи) онлайн. Например, в базе данных сценариев фильмов Интернета (IMSDb) есть хороший список сценариев фильмов, из которых вы можете выбирать. Просто найдите там любой фильм и читайте вместе со словами во время просмотра фильмов.

- Узнайте, как извлечь максимальную пользу из англоязычных СМИ.

Английские песни, видео, телешоу, фильмы и радио помогут вам говорить больше как на родном языке. Но иногда их трудно понять. Актеры могут говорить быстро, иногда перебивать друг друга, использовать выражения, которые вы, возможно, не знаете, и не утруждать себя объяснением того, что они означают.

Из-за этого может быть пугающим переход непосредственно к англоязычным СМИ. Если вы не хотите заблудиться, у вас может быть с собой словарь и записная книжка. Запишите слова, которые вы знаете и которых не знаете, и найдите любой

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незнакомый словарный запас. Вы могли бы даже набросать (записать) ключевые фразы и попытаться использовать их в разговоре, как только сможете.

Вы также можете подписаться на англоязычный канал FluentU на YouTube. Вы можете получить советы по изучению английского языка, используя классические фильмы, глупые песни и подкасты.

- Проверьте свою грамматику с помощью онлайн-тестов по английскому языку.

Когда вы самостоятельно изучаете английский, вы часто задаетесь вопросом, изучаете ли вы то, что должны изучать. Вот тут-то и пригодятся тесты. Как только вы закончите изучение, вы можете пройти тест, связанный с тем, что вы только что выучили. Эти тесты проверят вашу грамматику, построение предложений, понимание и многое другое. Проводите эти тесты еженедельно или ежемесячно, чтобы убедиться, что вы на правильном пути (на пути к достижению своих целей).

- Общайтесь с друзьями онлайн.

Общение с друзьями онлайн - это увлекательный способ самостоятельно изучать английский язык. В отличие от общения с учителем, занятий в классе или использования английского языка на работе, общение с друзьями более расслабляет, потому что вокруг людей, которых вы знаете лично, атмосфера проще.

Кроме того, то, что ваши друзья говорят с вами по-английски, повышает вашу мотивацию к обучению. Вы не только сможете доказать им, что ваш английский становится лучше, но и почувствуете себя более удовлетворенным, зная, что можете свободно говорить по-английски со своими друзьями в любое время.

Вы можете общаться с друзьями через:

• Текстовые приложения. Это поможет вам проверить любые грамматические ошибки, прежде чем нажимать кнопку "Ввод".

• Говорящие приложения. С помощью разговорных приложений вы можете практиковать свой разговорный английский.

- Читайте электронные книги, статьи и онлайн-журналы.

Чтение при изучении английского языка имеет такое же значение, как и аудирование. И то, и другое обостряет ваш ум, и приучает вас мыслить по-английски настолько, насколько это возможно. Когда вам приходится мысленно переводить все, что вы слышите или читаете, это занимает больше времени. Но если вы попрактикуетесь мыслить по-английски, вам будет легче понимать этот язык и говорить на нем. Чем больше вы читаете, тем больше знакомитесь со структурой английских предложений, новой лексикой и формальными и непринужденными речевыми моделями.

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К счастью, Интернет - это настоящая сокровищница электронных книг, статей и журналов на английском языке. Читайте на любую тему, которую вы хотите (например, о кулинарии, садоводстве или взаимоотношениях). Это важно, потому что каждое выученное новое слово или переученное старое слово - это дополнительные знания и практика для вас.

- Напишите о чем-нибудь, о чем вы думаете.

В конце концов, вам придется применять (практиковать в реальном мире) то, чему вы научились в процессе самообучения.

Отличный способ сделать это - написать что-нибудь свое собственное.

На самом деле, вы можете писать о чем угодно. Например, вы можете просто начать с личного дневника, куда сможете записывать свои мысли обо всем, что произошло в течение дня. Делайте это каждый день на английском, и вы сможете лучше понять, насколько хорошо вы владеете английским языком. После написания вы можете попробовать проверить свою работу на наличие каких-либо ошибок. Для этого позвольте носителю языка, которому вы доверяете, проверить вашу работу. Если ваш журнал находится на компьютере, вы также можете использовать такую программу, как Grammarly, чтобы выделить (показать как важные) любые ошибки в вашей работе.

Благодаря упорному труду и целеустремленности вы сможете преодолеть любые трудности при самостоятельном изучении английского языка. Поддерживайте свою мотивацию на высоком уровне и напоминайте себе, почему вы хотите изучать английский.

Также важно иметь цель, которая будет поддерживать вас в движении. Например, вы можете поставить перед собой еженедельную цель, например, выучить 20 новых слов в неделю или разговаривать с другом только по-английски.

Конечно, вам также поможет привлечение ваших друзей присоединиться к вам в вашем путешествии по изучению английского языка и поиск увлекательных способов изучения английского языка. Но, в конце концов, желание всегда должно исходить от вас.

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METHODS FOR PREVENTING ERRORS IN DIAGNOSING HARNESS ELEMENTS

Ibratbek Omonov

Urgench branch of Tashkent University of Information Technologies named after Muhammad al-Khwarizmi,

ABSTRACT

This paper discusses the application of the queuing theory framework to analyze the diagnostic processes of data transmission networks (DTNs). He principles of construction of systems for remote diagnostics of data transmission networks and performance algorithms considered in this article allow us to say that this approach allows solving the problem of the lack of highly qualified service personnel.

Diagnosing data transmission network elements is a critical task in ensuring reliable communication and minimizing downtime in modern digital infrastructures. However, the complexity and scale of networks make them prone to diagnostic errors, which can lead to inefficiencies, misconfigurations, or even severe service disruptions. This article explores strategies for preventing such errors by leveraging robust tools, systematic methodologies, and advanced technologies.

Keywords: Affect the speed, reliability, Packet Loss, High Latency, Self-Healing Networks.

Network performance issues refer to problems or challenges that affect the speed, reliability, and overall efficiency of a computer network. These issues can manifest in various ways and impact the user experience, data transfer, and communication within a network.

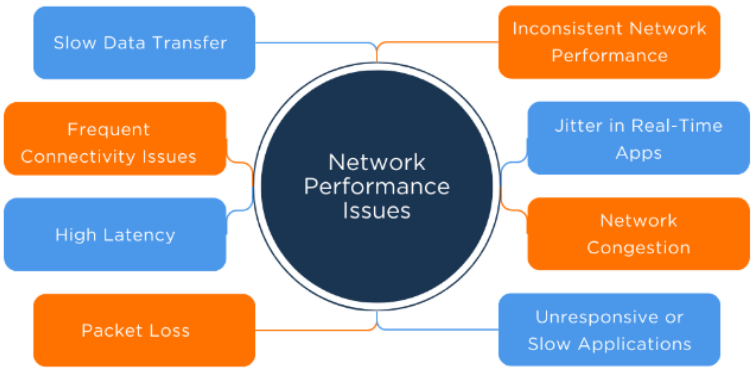

Figure 1. Network elements are the main elements of the diagnostic system.

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Slow Data Transfer: Sluggish file transfers, slow downloads, and delayed uploads are indicative of network performance problems. Users may experience extended wait times when accessing or moving data.

Frequent Connectivity Issues: Intermittent or frequent disconnections from the network can be a sign of instability or poor performance. Users may encounter dropped connections or have difficulty staying connected.

High Latency: Latency refers to the delay between sending and receiving data. High latency can result in delays in data transmission, affecting real-time applications such as video conferencing, VoIP (VoIP latency) or online gaming.

Packet Loss: Packet loss occurs when data packets are lost during transmission. This can lead to retransmissions and impact the overall speed and reliability of the network.

A reliable network is of paramount importance for businesses in today's digital landscape. It serves as the foundation upon which a multitude of critical operations and activities are built. Whether you're a small startup or a large enterprise, here's why a reliable network is indispensable for the success and growth of your business:

• Uninterrupted Communication: A dependable network ensures seamless communication among employees, clients, partners, and suppliers. Email, video conferencing, instant messaging, and VoIP (Voice over Internet Protocol) calls rely on a stable network connection. Any disruptions can lead to missed opportunities, delayed decision-making, and hindered collaboration.

• Efficient Operations: From inventory management to order processing, businesses heavily rely on interconnected systems. A reliable network enables smooth data transfer and real-time updates across different departments and locations. This efficiency translates into streamlined processes, reduced errors, and improved overall productivity.

• Data Security: Networks play a pivotal role in safeguarding sensitive business information. A secure network infrastructure helps protect customer data, financial records, proprietary information, and trade secrets from unauthorized access and cyber threats. A compromised network can lead to data breaches and legal consequences.

• Remote Work and Flexibility: The rise of remote work necessitates a dependable network that supports remote employees' access to company resources, databases, and applications. A strong network allows employees to work effectively from various locations, enhancing work-life balance and expanding the talent pool.

• Customer Satisfaction: In a digital-first world, customer interactions and transactions frequently occur online. A reliable network ensures that customers can access your products,

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services, and support channels without disruptions, leading to higher satisfaction rates and repeat business.

• Business Continuity and Disaster Recovery: Should unforeseen events such as natural disasters or hardware failures occur, a resilient network ensures that critical data can be backed up, replicated, and recovered seamlessly. This capability contributes to maintaining business continuity and minimizing downtime.

In essence, a reliable network serves as the digital backbone of a business, enabling efficient operations, fostering collaboration, enhancing customer interactions, and contributing to long-term growth. It is a strategic investment that can determine a business's ability to adapt, thrive, and succeed in an increasingly interconnected world

Before addressing prevention strategies, it is essential to understand common types of errors encountered during diagnostics:

1. Misinterpretation of Logs: Network logs can be voluminous and cryptic, leading to misinterpretation of events or patterns.

2. Faulty Test Procedures: Incomplete or incorrect testing sequences may miss or incorrectly identify the root cause of a problem.

3. Human Errors: Manual configuration or interpretation introduces potential errors due to oversight or a lack of expertise.

4. Inadequate Tools: Outdated or unsuitable diagnostic tools may fail to capture or correctly analyze network data.

5. Latency in Issue Detection: Delayed detection and response to network anomalies can exacerbate problems, leading to cascading errors.

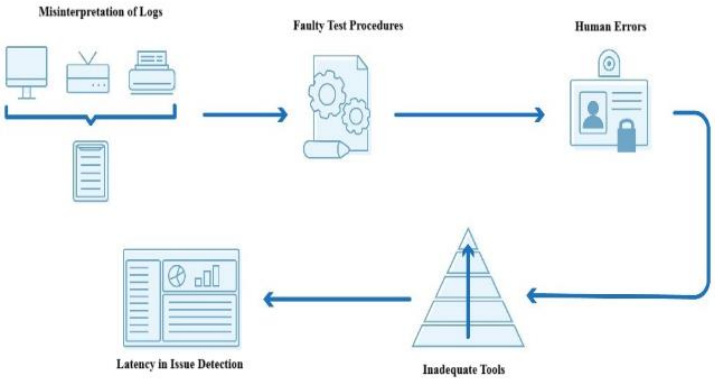

Figure-2. Understanding Common Diagnostic Errors.

The remote diagnostic terminal allows you to start running diagnostic algorithms for equipment and the data transmission network as a whole, remotely perform diagnostic operations

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available to data transmission network technicians, etc. Thus, the remote terminal is a kind of interface between the remote diagnostic system and the specialist located in the diagnostic centre.

2.METHODOLOGY

Prediction-error model. Let us consider a subset consisting of K nodes, of a dense wireless sensor network deployed in a civil structure that we wish to monitor. Each sensor node k, at discrete time t, acquires the measurement $y_k(t)$, which is related to an event that takes place in the area where the wireless sensor network has been deployed. Due to the nature of the observed phenomenon the measurements' process $y_k(t)$ is commonly a predictable one, at least to some extent. Therefore, the subset sensors' measurements can be predicted with some accuracy by using prediction-error models and a common excitation signal. In a nutshell, the input-output relation between the excitation and the sensor reading is modelled and using the excitation data in this model, the sensor's readings are predicted. This model is referred to as the Prediction Error Model and it is of the following form:

$$A_k(q)\,y_k(t) = \frac{B_k(q)}{F_k(q)}u(t) + \frac{C_k(q)e_k(t)}{D_k(q)}$$

where u*(t)* is the common excitation data and can be provided by a ''phenomenon dedicated'' sensor, or extracted from the readings of a reliable set of similar sensors. The system output is the measurement $y_k(t)$ while $e_k(t)$ is white-noise disturbance. The sensorspecific polynomials A_k, B_k, F_k, C_k, and D_k are specified by (i) the orders of polynomials *na*, *nb*, *nf*, *nc* and *nd*, respectively (ii) the model parameter coefficients to be estimated, $a_{k,1}$ ... $a_{k,na}$, $b_{k,0}$, $b_{k,1}$ ... $b_{k,nb}$, $f_{k,1}$ ... $f_{k,nf}$, $c_{k,1}$ ... $c_{k,nc}$ and $d_{k,1}$ ... $d_{k,nd}$, respectively, and (iii) the time-shift operator q.

For instance, for some discrete-time sequence *x(t)*, it holds $x(t)+ k_1x(t-1)=K(q)x(t)$ where $K(q)= 1+k_1q^{-1}$.

Note from equation (1) that, the prediction model is employing not only the most recent excitation data *u(t)* but also N previous history i.e., *u(t-1), ... , , u(t-N),* where $N= bn+nd$. The predicted value of the actual measurement

$y_k(t)$, which is obtained by the prediction model, we denote by $p_k(t)$: Thus, using its specific prediction model and the common excitation data, each sensor k performs the following steps:

a. Firstly, it predicts a value $p_k(t)$ for given time instant *t*.

b. Next, it subtracts the prediction from its actual reading $y_k(t)$ to generate an error signal $e_k(t)$,

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$$e_k(t) = y_k(t) - p_k(t)$$

c. And finally, it compares the error with a selected threshold (transmission criterion), and decides whether to transmit the error or not. This approach is illustrated in Figure 3.

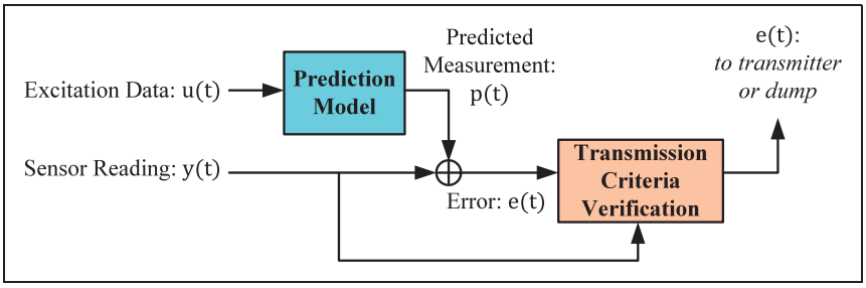

Figure-3. The protocol performed at each node.

To minimize diagnostic errors, organizations can adopt a multi-faceted approach that combines human expertise, automated systems, and proactive methodologies:

1. Implementing Comprehensive Monitoring Systems

• Real-time Data Collection: Use advanced network monitoring tools to collect real-time data, ensuring anomalies are detected promptly.

• Centralized Management: Employ centralized dashboards to aggregate data from various network elements, providing a unified view for easier interpretation.

Automating Diagnostics

• AI and Machine Learning: Deploy AI-driven tools capable of detecting patterns and predicting failures, reducing reliance on manual diagnosis.

• Automated Configuration Checks: Use automation to verify network configurations, minimizing the risk of manual errors.

Standardizing Diagnostic Procedures

• Predefined Protocols: Create standardized diagnostic protocols to guide technicians through systematic troubleshooting steps.

• Checklists: Implement checklists for common issues to ensure no critical step is overlooked.

Enhancing Human Expertise

• Training Programs: Regularly train network administrators on the latest tools, technologies, and diagnostic techniques.

• Knowledge Sharing: Foster a culture of knowledge sharing and collaboration among teams to build collective expertise.

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data transfer networks;

- introduction of new protocols for the transmission of diagnostic data and data protection tools;

- development of packages for functional diagnostics of devices with remote connection;

- development of diagnostic tests;

Leveraging Simulation and Testing

• Sandbox Environments: Use simulated network environments to test diagnostic tools and procedures without impacting live systems.

• Stress Testing: Conduct stress tests to evaluate network behavior under extreme conditions, enabling proactive identification of potential weak points.

Creating a MATLAB visualization for "Leveraging Simulation and Testing" involves plotting elements like a network topology and simulation results in a stylized way. Here's how we can simulate and visualize this concept in MATLAB:

Here is the MATLAB-style visualization for "Leveraging Simulation and Testing":

Left Panel: A simulated network topology with nodes and edges representing connectivity.

Right Panel: A stress test simulation showing a packet loss rate over time, with critical areas highlighted.

```
# Stress test data for simulation (e.g., packet loss or latency simulation)
time = np.linspace(0, 10, 100)
stress_metric = np.sin(time) + np.random.normal(0, 0.1, len(time))  # Simulated stress metric

# Create a figure
fig = plt.figure(figsize=(12, 6))

# Subplot 1: Network Topology
ax1 = fig.add_subplot(121)
ax1.set_title("Simulated Network Topology", fontsize=14)
ax1.set_xlim(0, 1)
ax1.set_ylim(0, 1)
ax1.scatter(positions[:, 0], positions[:, 1], s=100, c='blue', label="Nodes")
for i in range(num_nodes):
    for j in range(num_nodes):
        if connections[i, j] == 1:
            x_coords = [positions[i, 0], positions[j, 0]]
            y_coords = [positions[i, 1], positions[j, 1]]
            ax1.plot(x_coords, y_coords, 'k-', alpha=0.5)

ax1.legend()
ax1.set_xticks([])
ax1.set_yticks([])

# Subplot 2: Stress Test Simulation
ax2 = fig.add_subplot(122)
ax2.set_title("Stress Test Results: Packet Loss Simulation", fontsize=14)
ax2.plot(time, stress_metric, label="Packet Loss Rate", color='red', lw=2)
ax2.axhline(0, color='gray', linestyle='--', lw=1, label="Baseline")
ax2.fill_between(time, stress_metric, where=(stress_metric > 0), color='red', alpha=0.3)
ax2.set_xlabel("Time (s)", fontsize=12)
ax2.set_ylabel("Packet Loss Rate", fontsize=12)
ax2.legend()
ax2.grid(True, linestyle='--', alpha=0.7)
```

Figure-4. Creating a MATLAB visualization for "Leveraging Simulation and Testing" code.

Let me set up the code and provide a result

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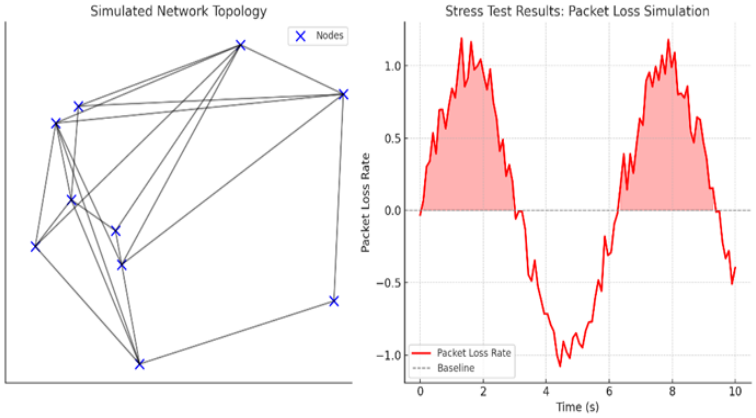

Figure-5. Result is "Leveraging Simulation and Testing".

Advanced Technologies in Diagnostic Error Prevention

Emerging technologies offer promising solutions to minimize diagnostic errors:

• Digital Twins: Create virtual replicas of network systems to simulate and analyze potential issues without disrupting the actual network.

• Self-Healing Networks: Implement networks with self-healing capabilities, where systems autonomously identify and correct anomalies.

• Edge Computing: Use edge analytics to process data closer to its source, reducing latency and improving diagnostic accuracy.

For a MATLAB simulation representing "Advanced Technologies in Diagnostic Error Prevention," we can showcase elements such as:

1. Digital Twins: Simulate a system using two identical models where one represents the real system and the other predicts behavior.
2. Self-Healing Networks: Visualize error detection and correction in real-time.
3. Predictive Maintenance: Plot predictions and thresholds for system health metrics.

Let's create a MATLAB simulation showcasing these ideas

```
# Create a figure
fig = plt.figure(figsize=(12, 6))

# Plot Real System vs. Digital Twin
ax1 = fig.add_subplot(121)
ax1.set_title("Digital Twin vs Real System", fontsize=14)
ax1.plot(time, real_system_health, label="Real System Health", color="blue", lw=2)
ax1.plot(time, digital_twin_health, label="Digital Twin Prediction", color="green", linestyle="--", lw=2)
ax1.axhline(threshold, color="red", linestyle="--", label="Maintenance Threshold")
ax1.fill_between(time, real_system_health, threshold, where=(real_system_health < threshold),
                 color="red", alpha=0.3, label="Anomalies")
ax1.set_xlabel("Time (s)", fontsize=12)
ax1.set_ylabel("Health Metric", fontsize=12)
ax1.legend()
ax1.grid(True, linestyle='--', alpha=0.7)

# Plot Self-Healing Correction
ax2 = fig.add_subplot(122)
ax2.set_title("Self-Healing in Action", fontsize=14)
ax2.plot(time, real_system_health, label="Original Health", color="blue", lw=2, alpha=0.5)
ax2.plot(time, corrected_health, label="Corrected Health (Self-Healing)", color="orange", lw=2)
ax2.axhline(threshold, color="red", linestyle="--", label="Maintenance Threshold")
ax2.set_xlabel("Time (s)", fontsize=12)
ax2.set_ylabel("Health Metric", fontsize=12)
ax2.legend()
ax2.grid(True, linestyle='--', alpha=0.7)

# Adjust layout and display
plt.tight_layout()
plt.show()
```

Figure 6. create a MATLAB simulation showcasing these ideas code.

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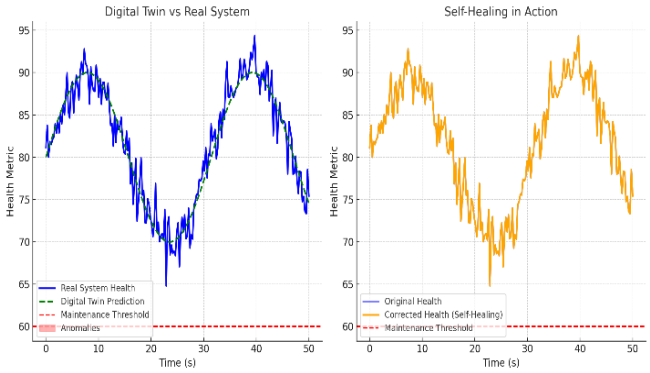

Figure 7. This simulation highlights Advanced Technologies in Diagnostic Error Prevention using MATLAB-style.

This simulation highlights Advanced Technologies in Diagnostic Error Prevention using MATLAB-style visualizations:

• Left Panel: Comparison between the real system health and its digital twin prediction. Anomalies (deviations below the threshold) are clearly marked.

• Right Panel: Self-healing correction, where anomalies in the real system health are detected and adjusted to stay above the maintenance threshold.

CONCLUSIONS

Preventing errors in diagnosing data transmission network elements requires a holistic approach that integrates technology, standardized practices, and skilled human oversight. By prioritizing automation, training, and advanced analytics, organizations can enhance their network reliability and operational efficiency, ensuring that diagnostic errors are minimized and swiftly addressed when they occur. The combination of proactive and reactive strategies is the key to maintaining robust, error-resistant network infrastructures.

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RF TRANSMITTER VA QABUL QILGICH DATCHIKLARI ORQALI MOTORLAR CHASTOTA VA TEZLIGINI MASOFADAN BOSHQARISH

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RF transmitter va receiver datchiklari orqali motorlar chastota va tezligini masofadan boshqarish uchun avtomatik qurilma

Masofadan boshqaruv tizimlari hozirgi zamon texnologiyalarida keng qo‘llaniladi. RF transmitter va receiver modullari arzon, ishonchli va uzoq masofaga signal uzatish imkoniyatiga ega. Ushbu maqolada motorlar chastota va tezligini masofadan boshqarish uchun RF modullar va datchiklar yordamida avtomatik qurilma yaratish tamoyillari ko‘rib chiqiladi.

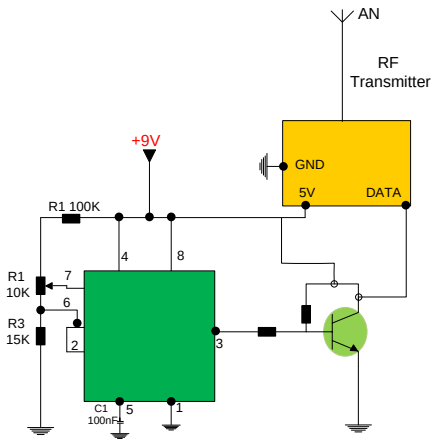
Tizimning umumiy tuzilishi

Ushbu qurilma ikkita asosiy qismdan iborat:

1. **Transmitter (uzatuvchi) qismi**: Motorni boshqarish uchun kerakli buyruqlarni hosil qiluvchi RF transmitter.
2. **Receiver (qabul qiluvchi) qismi**: RF signalni qabul qilib, ularni motorni boshqaruvchi signalga aylantiradi.

Qurilmaning ishlash prinsipi shundan iboratki, transmitter orqali foydalanuvchi motor tezligini yoki chastotasini o‘zgartirish uchun buyruq yuboradi. Receiver bu signalni qabul qilib, motorni boshqaruvchi qurilmaga uzatadi.

Xozirgi sanoat va fabrikalarda har xil turdagi dvigatellarni chastota tezligini oshirish yoki kamaytirish qurilmalarini chet eldan qimmat narxlarda sotib olinadi.



1-rasm. Q1815 dan terilgan kuchaytirgich

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Tizimning asosiy komponentlari

1. **RF transmitter va receiver modullari**
   - Ishlash chastotasi: Odatda 433 MHz yoki 315 MHz.
   - Signalning qabul qilish masofasi: O‘rtacha 100–200 m.
2. **Mikrokontroller (masalan, Arduino yoki STM32)**
   - Buyruqlarni kodlash va dekodlash vazifasini bajaradi.
   - PWM (Pulse Width Modulation) signallarini ishlab chiqadi.
3. **Datchiklar**
   - **Tezlik datchigi** (masalan, tachometer): Motor aylanish tezligini o‘lchaydi.
   - **Harorat datchigi** (masalan, LM35): Motorning haroratini kuzatadi.
4. **Motor boshqaruv qurilmasi**
   - Motorni o‘zgartirilgan chastota va kuchlanish bilan ta'minlaydi.
   - Elektron modullarda kuchli signal generatorlari (MOSFET yoki IGBT) ishlatiladi.

Bu avtomatik qurilmada RF uzatkich (transmitter) qurilma 3 qismdan tashkil topgan musbat kuchlanish ulanish joyi 5v manfiy kuchlanish ulanish joyi DATA ma`lumot qabul qilish joyi.

RF uzatkich (transmitter) qurilmasini antennasidan tarqalayotgan signal RF qabul qiluvchi (receiver) yetarli bo`lmaydi.

Shuning uchun sxemaga qo`shimcha signalni Q1815 n-p-n tranzistor orqali kuchaytirish kerak. 1-rasmda Q1815 dan terilgan kuchaytirgichga ulash ko`rsatilgan.

Q1815 tranzistor kollektor qismidan RF uzatkich (transmitter)ni DATA qismiga ulanadi.

RF uzatkich (transmitter)iga dvigatelni chastota tezligini oshirish yoki kamaytirish topshirigi berish uchun LM 555 mikro kontrollerdan foydalanamiz.

LM 555 mikro kontrolleri 3-5-12V doimiy tok bilan ishlaydi.

LM 555 mikro controller 8-oyoqchadan iborat.

1-oyoqcha manfiy kuchlanish 4-8 oyoqchalari musbat kuchlanish ulanadi.

3-oyoqcha orqali Q1815 tranzistorni baza qismiga ulanadi bu jarayon R1 10K potensiometr orqali qarshilikni uzgartirganda LM 555 ni 3-oyoqchasidan chiqadigan signal Q1815 tranzistorni bazasiga ulanadi kollektor qismidan RF uzatkich (transmitter) Data qismiga ulanadi bu kuchaytirilgan signal RF qabul qiluvchi (receiver) antenasiga masofadan uzatiladi.RF qabul qilgich yana MOSFET tranzistor orqali dvigatelga ulanadi. RF qabul qilgich qurilmasi qismlariga bo`lingan ya`ni VCC 5V GND manfiy tok A-antenna Data ma`lumot qabul qilish.

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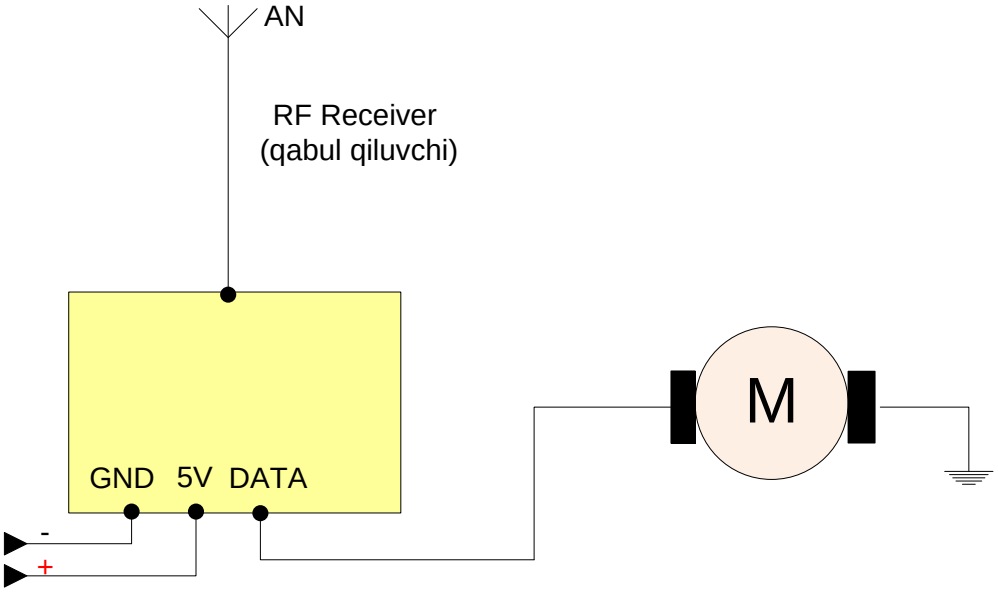

2-rasm. Bu avtomatik dvigatellar chastota tezligini masofadan boshqarish qurilmasi

Avtomatik dvigatellar chastota tezligini masofadan boshqarish qurilmasini afzallik tomoni shundaki xar xil kuchlanishda ishlaydigan dvigatellarni tristor, simistor 16V yuqori kuchlanishli tranzistorlar bilan masofadan boshqarish imkoniyati mavjud (2-rasm).

Bu yasalgan qurilma 5v doimiy kuchlanishda ishlaydi. O`zgarmas tok manbalari (batareya, akkumlyator va h.k)da ishlaydi.

RF qabul qilgich (receiver) qurilma bilan RF uzatkich (transmitter) qurilmasi sanoatda ishlab chiqarishda qo`llanilsa davlatimiz iqtisodiga ancha pul mablag`ni tejagan bo`lamiz.

Sababi dvigatellarni ishga tushirish uchun turli xildagi kabellar ishlatiladi bu avtomatik qurilma kabellarni tejab qoladi va masofadan boshqaradi.

Foydalanilgan adabiyotlar

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LM324 ORQALI -FAZA MOTORLARNI CHASTOTA TEZLIGINI ROSTLASH AVTOMATIK QURILMA

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Hozirgi kunda bolalarimiz o`ynaydigan parklarda har xil turdagi doimiy tok bilan xarakatlanadigan skutir velosipedlar, 48V doimiy 3-fazali invertorlar quyilgan xar xil turdagi mashinachalarni chet davlatlardan sotib olinmoqda.

Shu avtomatik qurilmalarni yasasak davlatimiz iqtisodiga foyda keltirgan bo`lamiz.

Bu avtomatik qurilmani motorlarini chastota tezligini oshiruvchi invertorlarini mahaliy sharoitdan kelib chiqib o`z qo`limiz bilan yasashni maqsad qildik.

Bu avtomatik qurilmada asosiy elementlar LM324 mikro sxema va 6-dona IRF-540 MOSFET tranzistorlari xisoblanadi.

Uskunalar va avtomatlashtirilgan tizimlarda 3-faza motorlar keng qo'llaniladi. Chastota va tezlikni samarali boshqarish orqali energiya samaradorligini oshirish va tizimning barqarorligini ta'minlash mumkin. Ushbu maqolada LM324 operatsion kuchaytirgich asosida 12 V bilan ishlovchi 3-faza motorlarning chastota va tezligini avtomatik rostlash qurilmasini yaratish usuli ko'rib chiqiladi.LM324 mikro sxema 10,5,3 oyoqchalari manfiy qutbiga ulanadi.LM324 mikro sxemani 8,7,1 oyoqchalari esa qurilmadagi T_1,T_2,T_3,T_4,T_5,T_6 IRF540 tranzistorlarni asosida signallar kombinasiyasini hosil qiladi.Bu avtomatik qurilma 48 v doimiy kuchlanishdan 3-faza o`zgaruvchan kuchlanishni 6-dona IRF540 tranzistorlarga 1-rasmdagi grafikga xosil bo`lgan signallar orqali 3-faza tok ishlab chiqaradi.

Qurilmaning umumiy ishlash prinsipi

LM324 to'rt kanalli operatsion kuchaytirgich bo'lib, chastota modulyatsiyasi, kuchlanishni o'zgartirish, va boshqaruv signallarini hosil qilish uchun ishlatiladi. Qurilmaning asosiy funksiyalari:

1. Chastota va amplituda boshqaruvi: LM324 asosida chastota signali hosil qilinadi.
2. PWM (Pulse Width Modulation): Motor o'zgaruvchan signal orqali boshqariladi.

3. Avtomatik boshqaruv tizimi: Tizim dastlabki parametrlarni (tezlik va quvvat) foydalanuvchi tomonidan o'rnatish va motorni optimal ishlash rejimida ushlab turadi.

Bu motorlar chastota tezligini boshqarish qurilma 9V barqororlashgan doimiy tok bilan ishlaydi.

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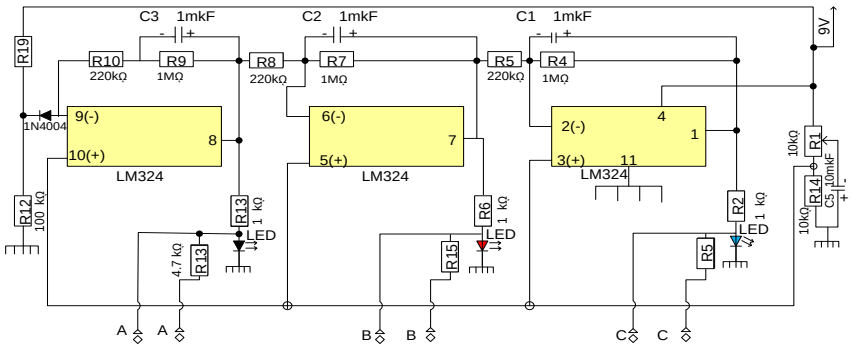
Qurilmada ishlatiladigan elementlar:

1. R1=10K o`zgaruvchan qarshilik.
2. R2=1K
3. R3=1K
4. R4=1M
5. R5=220K
6. R6=1K
7. R7=1M
8. R8=220K
9. R9=1M
10. R10=220K
11. R11=100K
12. R12=4,7K
13. R13=4,7K
14. R14=33K
15. LED=3X3V lampa
16. 6-dona IRF540 tranzistor
17. 12v 1-dona Transformator
18. 3A 1-dona Diod kuprik
19. KP7809 1-dona CLOCK-DESK
20. C_1,C_2,C_3 1 MKF 16 V kondetsator
21. C_4=10 MKF 16V kondetsator
22. C_5=25V 2000MKF kondetsator
23. D_1=1N4004 diodi



1-rasm. LM324 mikrosxema bilan rostlashning prinsipial sxemasi

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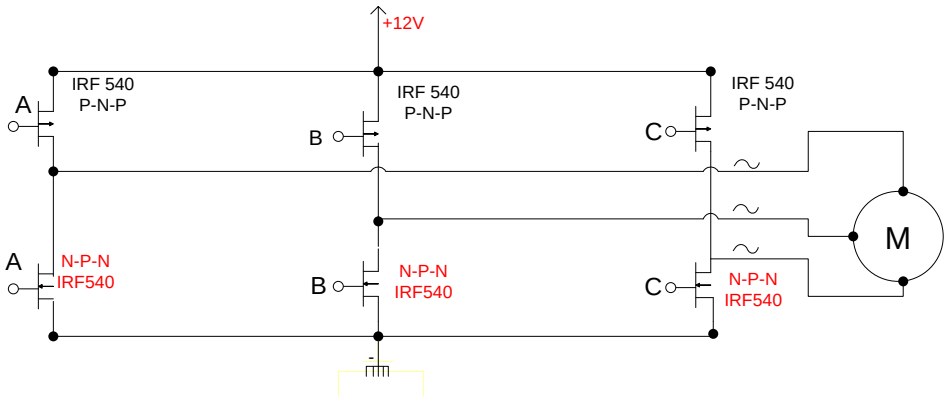
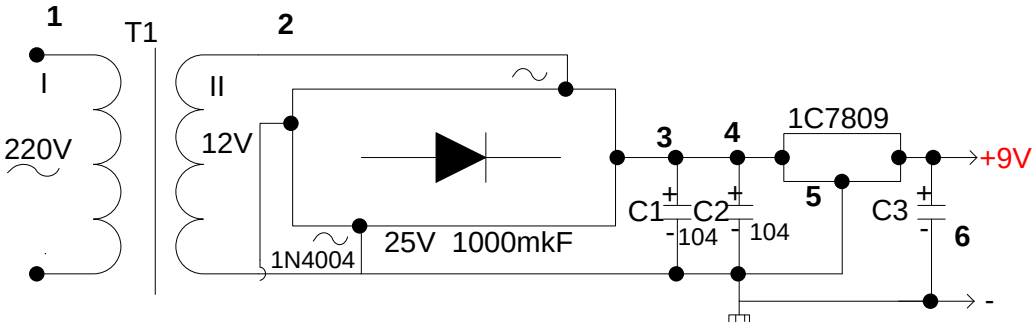


2-rasm. 3 fazali motorni IRF540 tranzistori bilan chastotasini o'zgartirish



3-rasm. Tizimning barqarorlovchi sxemasi

• Arzon va samarali: LM324'ning arzonligi qurilmaning iqtisodiy jihatdan maqbulligini ta'minlaydi.

• Oson dasturlashtiriladi: Oddiy analog va raqamli usullarni birlashtirish imkoniyati mavjud.

• Moslashuvchanlik: Turli xil motorlar va boshqaruv rejimlariga moslashtirilishi mumkin.

Ushbu LM324 mikrosxema orqali 3 fazali 12 V tokni rostlash imkoniga ega bo'lamiz. Uning asosiy afzalligi qurilmaning yuklamaga bardoshli ekanligi va kam tok orqali ko'proq mehnat unumiga ega bo'lamiz.

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MUQOBIL ENERGIYA MANBALARI ASOSIDA MOBIL UYLARNING ENERGIYA TA'MINOT TIZIMLARINI TADQIQ QILISH

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Ko‘pincha ishlab chiqarilgan uylar deb ataladigan ko‘chma uylar qariyb bir asr davomida Amerika uy-joylarining asosiy toshi bo‘lib kelgan. Ko‘chma uylar dam olish uchun mo‘ljallangan treylerlar sifatidagi kamtarona boshlanishidan hozirgi maqomiga qadar arzon, samarali va ko‘pincha hashamatli turar-joylargacha, Qo‘shma Shtatlardagi kengroq ijtimoiy va iqtisodiy tendentsiyalarni aks ettiruvchi ajoyib evolyutsiyani boshdan kechirdi. Ular uy-joy inqiroziga yechim bo‘lib xizmat qilgan, amerikalik zukkolik ramzi va ba'zida *jamiyatda stigma mavzusi bo‘lgan.* Ammo, biz bu fikrlash tarzini tarqatish uchun keldik, chunki ularning ahamiyati oddiy boshpanadan tashqari, jamiyat, o‘ziga xoslik va Amerika orzusining murakkab masalalariga to‘xtalib o‘tadi.

Bugungi kunda energiya tejamkor ishlab chiqarilgan uylar arzon, qulay va bardoshli uy-joy variantini taklif qiladi. Ishlab chiqarilgan uylar turli xil dizaynlarda va uchastkada qurilgan uylarga o‘xshash zamin rejalarida mavjud.

Mobil uylarning tarixi 20-asrning birinchi yarmiga to‘g‘ri keladi. Ular, ayniqsa, bu davrda AQShda arzon uy-joy bilan ta'minlash uchun ishlatilgan. Sanoat 1950-yillarda ishlab chiqaruvchilar yuqori sifatli materiallardan foydalanishni boshlaganlarida sezilarli bumni boshdan kechirdi.

Hozirgi kunda butun dunyo olimlari ilmiy izlanishlar olib bormoqdalar. Jumladan, T. Nsilulu, M. Bungu, K. Ramesh, M. Radj, kabi olimlar mobil uylardagi elektr energiyasining avtonom ta’minot tizimi bo‘yicha Janubiy Afrikaning ko‘pgina hududlarida tadqiqotlar o‘tkazmoqda. Ular olib borayotgan ilmiy ish faqatgina elektr energiyani samarali boshqarishga oid bo‘lib, muqobil energiyaning boshqa turlari bilan integratsiyalashmaydi.

O‘zbekiston Respublikasi Prezidentining 2020-yil 10-iyuldagi “Iqtisodiyotning energiya samaradorligini oshirish va mavjud resurslarini jalb etish orqali iqtisodiyot tarmoqlarining yoqilg‘i energetika mahsulotlariga qaramligini kamaytirishga doir qo‘shimcha chora-tadbirlar to‘g‘risida”gi PQ-4779-sonli hamda O‘zbekiston Respublikasi Vazirlar Mahkamasining 2020-yil 23-iyuldagi “Qayta tiklanuvchi energiya manbalari qurilmalari va ulardan ishlab chiqariladigan energiyaning davlat hisobini yuritish chora-tadbirlari to‘g‘risida”gi 452-sonli qarorlarida

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iqtisodiyotda energiya hamda resurslar sarini kamaytirish, energiya tejaydigan texnologiyalarni joriy etish, qayta tiklanadigan energiya manbalaridan foydalanishni kengaytirish, iqtisodiyot tarmoqlarida.

O‘zbekiston Respublikasi Prezidentining 2022-yil 20-dekabrda Oliy Majlis va O‘zbekiston xalqiga Murojaatnomasida yashil energetika sohasini keng joriy qilishga qaratilgan muhim ahamiyatga ega bo‘lgan bir qator vazifalar belgilandi. Jumladan, mamlakatimiz energiya manbalaridan uzoq hududlarda mini quyosh elektrostansiyalari qurish va energiya samarador bo‘lgan quyosh kollektorlarini o‘rnatish bo‘yicha muhim topshiriqlar berildi.

Mobil uylar turli odamlar guruhlari va vaziyatlar uchun foydali bo‘lishi mumkin. Ko‘chma uylarni ayniqsa foydali deb bilishi mumkin bo‘lgan ba'zi misollar:

- Sayohatchilar va lagerlar: Ko‘chma uylar sayohat va lager paytida qulay va qulay yashash imkoniyatini beradi. Ular tabiat qo‘ynidan zavqlanish va shu bilan birga zarur qulayliklardan foydalanish imkonini beradi.
- Vaqtinchalik yashovchilar: Ko‘chma uylar vaqtinchalik uy-joyga muhtoj odamlar uchun ideal variant bo‘lishi mumkin, masalan, asosiy uyni qurish yoki ta'mirlashda yoki uzoq joylarda ishlashda.
- Kam byudjetli uy-joy: mobil uylar an'anaviy uylarga qaraganda ancha arzon bo‘lishi mumkin. Ular o‘z uyini qidirayotgan, ammo an'anaviy uylar yoki kvartiralarning narxini ko‘tara olmaydigan odamlar uchun byudjetga mos alternativani taqdim etishi mumkin.
- Qariyalar va yosh oilalar: Mobil uylar minimal texnik xarajatlar bilan qulay, mustaqil uy-joy izlayotgan qariyalar uchun jozibali bo‘lishi mumkin. Ular, shuningdek, uy egasi bo‘lish sayohatini endigina boshlayotgan yosh oilalar uchun yaxshi variant bo‘lishi mumkin.
- Ekologik ongli odamlar: Mobil uylarni energiya tejaydigan texnologiyalar va materiallardan foydalangan holda barqaror qurish mumkin. Ular resurslarni iste'mol qilish va atrof-muhitga emissiyalarni kamaytirish orqali yanada ekologik ongli hayot kechirish imkoniyatini taklif qiladi.

Mobil uy Ko‘chma uydagi elektr tizimlari asosiy elektr paneli, sxemalar, simlar, rozetkalar va kalitlardan iborat an'anaviy uyga o‘xshaydi. Elektrni o‘rnatish jarayonining qisqacha tavsifi:

- Asosiy elektr xizmati: ko‘chma uy elektr energiyasi iste'molini o‘lchaydigan hisoblagich bazasi orqali asosiy elektr xizmatiga ulangan. Xizmatga kirish kabeli elektr ta'minoti ustunidan yoki yer osti manbasidan uy ichidagi asosiy elektr paneliga quvvat o‘tkazadi.

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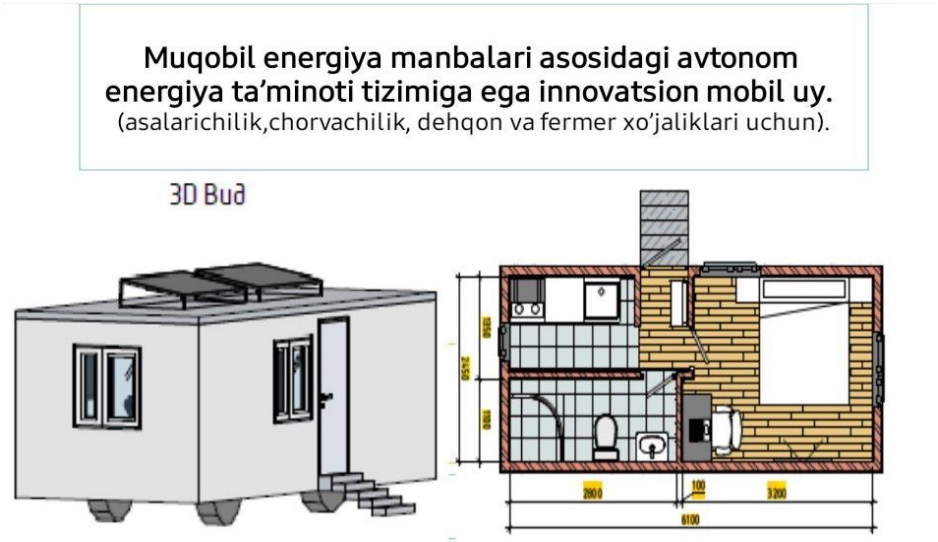
• Asosiy elektr paneli: Asosiy elektr panelda elektr tokini mobil uy bo‘ylab turli davrlarga tarqatadigan o‘chirgichlar yoki sigortalar mavjud. Har bir kontaktlarning zanglashiga olib, ma'lum joylar yoki asboblarni quvvat bilan ta'minlaydi.

• O‘tkazgichlar va rozetkalar: Mis simlari odatda ko‘chma uylarda elektr tokini o‘tkazish uchun ishlatiladi. Simlar devor va shiftlar orqali o‘tkaziladi, yo‘l bo‘ylab rozetkalarni va kalitlarni birlashtiradi. Xavfsizlikni ta'minlash va ortiqcha yuklanishni oldini olish uchun simlar mahalliy elektr kodlariga mos kelishi kerak.

Topraklama va ulash: Mobil uylar yashovchilarni elektr toki urishidan himoya qilish uchun to‘g‘ri topraklama va ulashni talab qiladi. Bu elektr tizimini topraklama elektrod tizimiga ulashni o‘z ichiga oladi, odatda erga ulangan tuproqli novda orqali.



1-rasm. Mobil uy elektr tizimlari

Ko‘chma uylardagi mobil uy tizimlarida sanitariya-tesisat-elektr va konditsionerni tushunish uy egalari va ijarachilar uchun juda muhimdir. Ushbu tizimlar qanday o‘rnatilishi va ishlashi haqida ma'lumotga ega bo‘lgan shaxslar muammolarni yaxshiroq hal qilishlari, texnik xizmat ko‘rsatishlari va yangilash yoki ta'mirlash bo‘yicha ongli qarorlar qabul qilishlari mumkin. Ko‘chma uylarda sanitariya-tesisat quvurlari, elektr liniyalari va AC qurilmalarining nozik tomonlarini hisobga olgan holda siz xavfsiz, qulay va funktsional yashash muhitini ta'minlay olasiz.

Gaz mahsulotlari mobil uylarni isitish zo‘r usuli bo‘ldi. Ular tejamkor va ko‘p parvarish qilishni talab qilmaydi. Albatta, ular turli xil variantlar bilan birga keladi, shuning uchun tizimingizni ehtiyojlaringizga mos ravishda sozlashingiz mumkin. Misol uchun, siz foydalanmoqchi bo‘lgan gaz turini tanlashingiz mumkin, masalan, propan yoki butan.

Yoqilg‘i hayotimizning muhim qismidir. Ular bizning uylarimizni isitadi, yorug‘lik va quvvat beradi, bizni va yuklarimizni tashiydigan transport vositalarini energiya bilan ta'minlaydi. Lekin biz foydalanadigan yoqilg‘ilar turli xil manbalardan kelib chiqishi mumkin va yoqilg‘i nimadan iborat bo‘lishi uning xususiyatlariga ta'sir qiladi. Uylarda ishlatiladigan eng keng tarqalgan yoqilg‘ilardan biri bu gaz bo‘lib, u tabiiy gaz, propan va butan kabi ko‘plab shakllarda keladi.

Ko‘pgina mobil uylarda pishirish va isitish uchun yagona imkoniyat propandir. Lekin bu har doim ham oddiy emas. Ba'zi ko‘chma uylar propanga nisbatan ba'zi muhim afzalliklarga ega bo‘lgan gaz plitalari kabi gaz mahsulotlarini ishlatishga qodir. Odamlarning gaz mahsulotlarini tanlashining asosiy sabablaridan biri shundaki, ular ko‘pincha propandan arzonroqdir.

1.	Quyoshfotobatareyasi	1 NF = 2000 Vt
2.	Quyosh-suvisitishkollektori	1 G = 500 l/suv (sutkasigayozda 500 litrissiqsuvishlab-chiqaradi)
3.	Issiqsuvbakakkumulyatori	1 G = 500 l/suv
4.	Biogazqurilmasi	1 V = 0,7 m^3
5.	Pirolizqurilmasi	1 V = 1,5 m^3

Xulosa

Tadqiqot natijalari shuni ko‘rsatdiki, taklif qilinayotgan mobil uyning elektr energiyasi iste’molchilari o‘rtacha sonini 4 ta deb olsak, ular uchun kunlik ehtiyoj miqdori 1,5÷1,8 kVt ni tashkil qiladi. Natijada 1 oy davomidagi ehtiyoj uchun 30÷45 kVt kerak bo‘ladi. Ushbu natijalarga tayanib, hajmi 40 m3 va umumiy yuzasi 72,5 m2 bo‘lgan mobil uy iste’molchilari uchun soatiga 1,5÷2 kVt elektr energiyasi ishlab chiqaradigan quyosh fotoelektr batareyasini o‘rnatish orqali elektr energiyaga bo‘lgan ehtiyojni to‘liq qoplash mumkin. Umumiy hajmi 40 m3 bo‘lgan mobil uy uchun biogaz va quyoshga asoslangan integratsiyalashgan energiya ta’minoti tizimi yiliga 2,5÷2,8 tonnagacha shartli yoqilg‘ini tejash imkonini beradi.

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