Volume 2, Issue 11, November 2024 **ISSN (E):** 2938-3757

ALGORITHM FOR DRAWING UP STRUCTURED SCHEMES OF AUTOMATIC CONTROL SYSTEMS

X. O. Abdullayev
Namangan muhandislik-texnologiya instituti,
E-mail: hakim-olim@mail.ru

Abstract

As a unique approach to the study of automatic control systems, an algorithm for drawing up structured schemes, which is one of the forms of mathematical models of them, is presented. As an example of using the same algorithm, the structure of an automatic greenhouse temperature control system is given.

Objective. The object of research in this work is the automatic control system, and the subject of the study is the structural scheme of this system.

Methods. In this study, systematic analysis was used as research method. According to the system analysis, the automatic control system is disassembled into parts, the structure corresponding to the functions of the parts is shown.

Results. It has been shown that when an automatic control system is broken down into parts, that is, elements, it becomes easier to describe them mathematically. As a result of the work, an algorithm for drawing up structural schemes of automatic control systems is presented.

Conclusion. Fundamental, kinematic and other schemes can also be used for a deeper study of the operation of objects, however, it is precisely structural or functional schemes that are used the most because they are simpler, more visual, able to abstract redundant factors and clearly demonstrate the process of control throughout the cictema, and allow for an easy understanding of what the system itself is designed for and how the system works itself.

Keywords: boiler unit, mathematical model, identification, modeling, controller, regulation.

Introduction

It is known that the social importance of modern production is increasing, accordingly, researches on the study of automatic control systems, the results of which are published in textbooks and teaching aids. The unique approach in the study of automatic control systems is to represent them in the form of mathematical expressions, for example, differential equations – mathematical models. If an automatic control system (ABS) is divided into parts, i.e., elements, it becomes easier to describe them mathematically, while compiling mathematical models for such parts is simpler than constructing a mathematical model of the system as a whole (Figure 1). In order to obtain a mathematical model of ABS, it is necessary to distinguish the elements of this system from each other by different methods. For example, the division of a system into separate special blocks according to its structural designation is also provided by algorithms, with the differentiation of the functions of different parts of the system. Depending on how ABS is viewed in this way, the following types of schemes have been identified and their definitions are given: structured scheme, functional scheme and algorithmic scheme. Such schemes, in turn, form the basis for the compilation of differential equations of ABS, in this context the creation of a method, algorithm for obtaining structural schemes of ABS, the development of science and technology in the field of automation and control of technological processes and production.

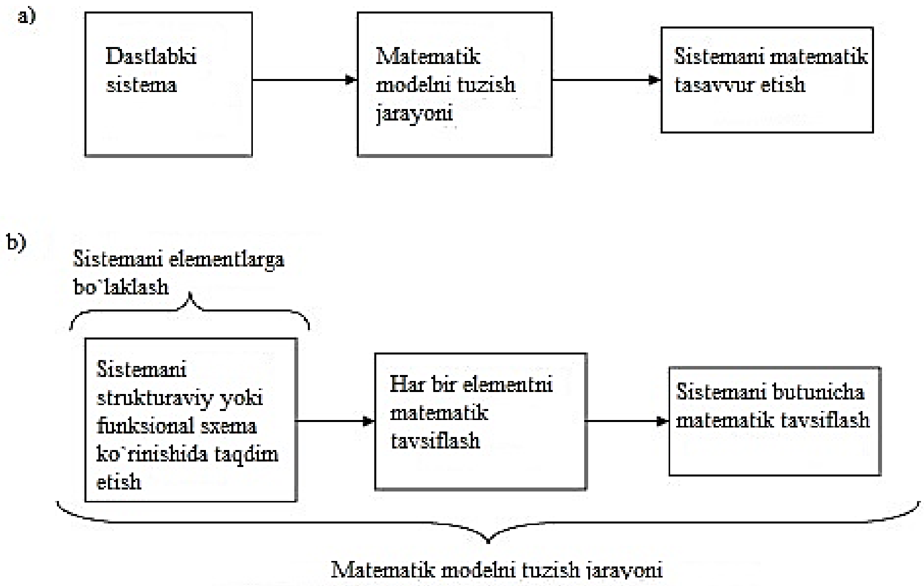

Figure 1. Initial stage of mathematical description of an automatic control system

Methods

We take ABS as consisting of parts, i.e., elements, and we introduce the concept of structure to reflect the set of elements of that system and their interconnections. When we say structure, we mean a set of properties related to the size, shape, structure of an object. When we describe the structure, a structured scheme emerges. Thus, a structural scheme is a reflection of the set of elements of a system and their interconnections; The concept of structure differs from the concept of a system itself in that when describing a structure, only types of elements and connections are taken into account, and not concretize their parameters, values.

Sturktural waxing – in the sense of a mathematical description of a system, it is a graphical representation divided into blocks, which reflects the directions of transmission of influences to the system both from the external environment and between blocks.

From this definition it follows that there are two types of structural scheme: a) a structural scheme that illustrates the main functional parts of a system, what they are intended to do and the relationships between them, which we **call a functional structural scheme**; b) a picture that mathematically describes the interactions of variables in a system and how that system interacts with the external environment, which is a **structural scheme** with a transfer function We call it that.

In the first case (Fig. 2), the name of the functional part is written inside each rectangle representing the functional part of the system.

In the second case (Fig. 3), the expression of the transmission function known from the literature is placed inside the right rectangle. If there is no expression of the transmission function in the

Web of Technology: Multidimensional Research Journal
webofjournals.com/index.php/4

 ISSN (E): 2938-3757

literature, it is determined by differential equations describing the dynamic dependence of input and output variables of a functional part.

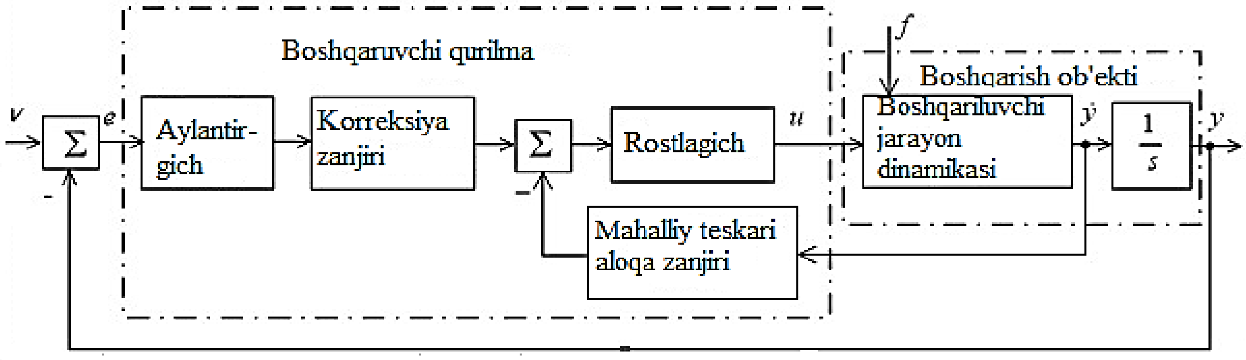

Figure 2. Functional structure scheme of the system

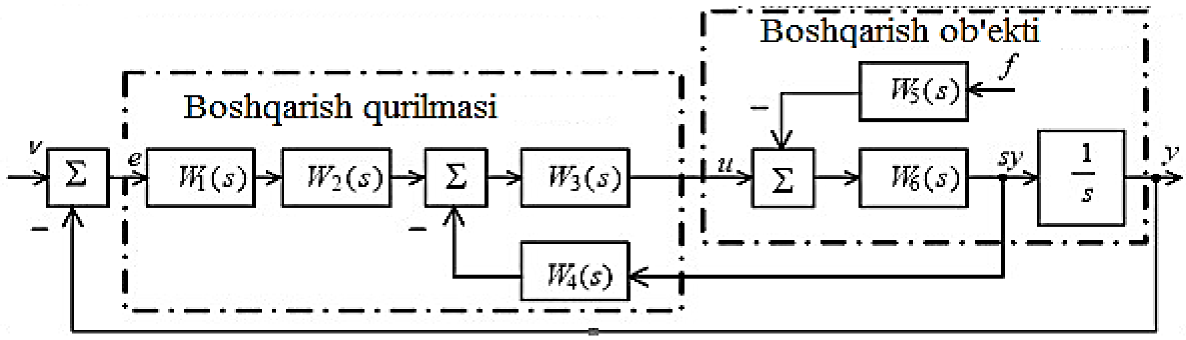

Figure 3. Structural diagram of the system with transmission function

A structured scheme can be drawn up with great or small detail, depending on the level of research and the question of learning an automatic control system.

Schemes in which only the main or enlarged parts of the control system are shown are called generalized schemes.

It is also possible to complicate the scheme by showing in more detail the elements put into the system, but for this study, if necessary, because the simpler the initial description, the more work remains.

For example, in a car only what drives it (the driver) and the car itself can be distinguished, or it is possible to take into account that a large number of devices go into the car: the brake system, the internal combustion engine, the transmission, etc., they can all be displayed.

We note that it is necessary to start with exactly the simplest, simple scheme, and then try to develop it in detail.

The most "simple" scheme of ABS is the one in which the control object and the controller are connected (Fig. 4).

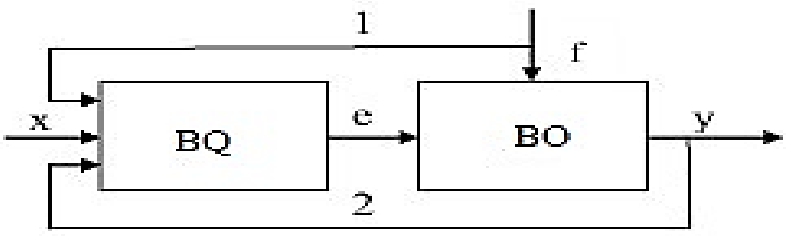

Figure 4. Generalized functional structure scheme of the control system.

It is possible and necessary to control the activities of the technical system, a device that carries out a dynamic process to achieve the goals set in front of the technical system. **control object** is called.

Controller (BQ) – is designed in such a way that it exerts an effect on the control object according to the control algorithm. The control device has other names as well: **regulator (regulator)**, if it maintains a manageable magnitude at an unvariable rate or in a constant range, and **managed subject**, according to the rule, if a person, group of people or an organization is put as the control device.

Figure 4 also shows the signals of the system: x – the transmitter (input) effect; e – controlling effect; y – controlled magnitude (regulatory, regulatory) magnitude (output effect); f – Tumultuous effect. Chains 1 and 2 may or may not be depending on the system being considered. If we receive information about the results of the control process in any way, then 1 circuit is involved, for example, the driver directly sees in which direction and at what speed the car is moving, the temperature sensor is involved in the room, in the building temperature control system, to find out how to control the temperature: to increase or decrease. 2 Chains are passed if the system has ideas about the effects that prevent pre-control, i.e., the disturbances that exist in that system. For example, weather compensators are introduced into the system, in which the temperature given to the heating system is changed by the outside air temperature sensor in the front (compensation is carried out according to weather conditions): the colder it is, the higher the temperature of the heat carrier is set and vice versa.

Functional structuralityali sxema – a scheme that reflects the functions of individual parts of the control system (what it is designed for, for what purpose) and their interaction.

Such functions may be: [9]

- management;
- signal conversion;
- Compare signals, and b.

The names of devices in the functional scheme indicate that they perform a specific function:

- sensor (gauge rotary);
- Amplifier;
- comparison block (or summator);
- control device;
- the executive element, and b.

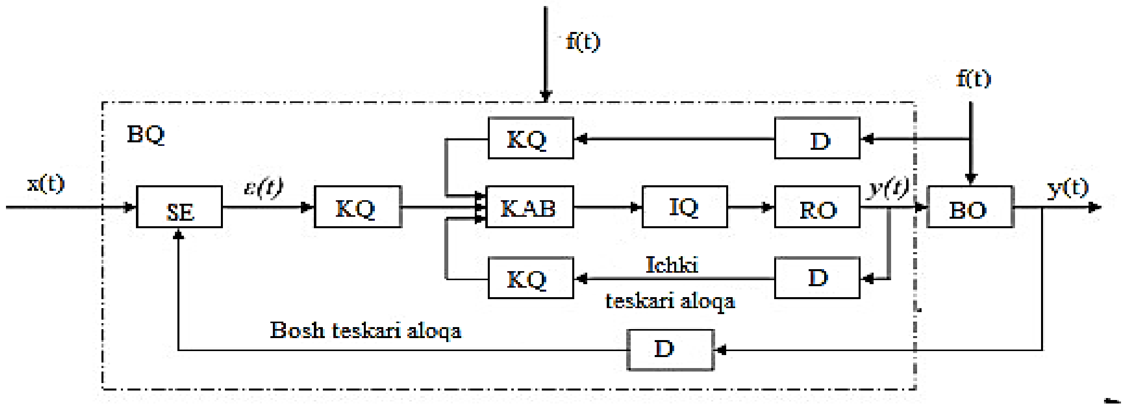

Figure 5. ABS functional scheme

Figure 5 illustrates the following functional devices:

D – sensor – generates a signal proportional to a certain shown effect;

SE – the comparison element – is designed to compare the controlled magnitude x(t)(we have) with the transmitter effect $xy(t)_{t.b}(t)$(in us), this is done by generating a signal that is proportional to the deviation of magnitudes from each other; $y(t)$

KZ – corrective chain – is designed to change the structure of systems in order to improve the performance of quality of control.

KAB – amplifier-converter unit – serves to amplify the signal and convert it into the desired form;

RO – regulatory body – serves to have a direct impact on the regulated (adjustable) environment (examples of RO are: valve, zadvijka, thyristor, etc.);

IQ is an executive device – designed to move a regulatory body (examples of IQ: electromotor, electromagnet, stationery).

In this diagram (Fig. 5), the control device and the control object are separated by a point.

The algorithm for obtaining the functional schema (Figure 5) is as follows:

1. To determine the magnitude that is controlled by a clear concretization of the purpose of the system, this is accomplished by answering this question: what is the purpose of this system, and what are the results of its work?
2. Separating the control object by manageable magnitude is that it should answer this question: what we control in the system, what implements the control size, or what the manageable magnitude is. The object of control can be considered by itself a complex system of elements. For example, an airplane, a car, a steam boiler, a computer.
3. We distinguish the object of control by answering this question: who or what receives the transmitter influence (and, possibly, who or what receives the disturbing and controlling influence), who or what shows its effect on other elements that affect the object of control.
4. A controlling effect (a signal of an optional nature) emanates from the controller, and it answers this question: by what means does the control device directly affect the controlling object or the controlled magnitude?
5. Finally, the tumultuous effect is determined by the answer to this question: what other factors affect the controlling magnitude, in addition to the controlling effect, which prevents the control objective (from maintaining the output effect at a given level)?

Results

We apply the above algorithm to draw up both structural and functional schemes of the automatic control system for air ventilation in a greenhouse.

We examine the ventilation system in the greenhouse. If it gets too hot in the greenhouse, the controller of the greenhouse takes a suitable signal from the temperature sensor and connects the electric motor, which at the same time opens the window for ventilation of the greenhouse. Appropriately, when the temperature drops, the window closes in this way. Distinguishing the listed points, draw up a structured scheme:

1. The system is designed to keep the air temperature in the greenhouse the same, constant, which means that the controlled temperature is the temperature.

Web of Technology: Multidimensional Research Journal
webofjournals.com/index.php/4

2. The controllable parameter (magnitude) is located in the greenhouse, from which it follows that the control object is a greenhouse. This observation can also be inferred from the formulation of what the system is designed to do, as well as "keeping the temperature of the air in the greenhouse (keeping the temperature of the air in the building uniform)."
3. The controller receives the transmitter effect, which itself controls both the engine and the temperature sensor, which affects the state of the valve. No one controls the controller himself, however, in relatively complex systems it may be a controller, as well as a high-level operator. This serves as the main distinction between the control device and the executive mechanism and the regulatory body. By performing the effects to maintain the temperature at a constant level, the controller is called a regulator.
4. The controlling effect is the flow of air passing through the open window, or its absence, because it directly affects the controlled magnitude – the temperature in the greenhouse.
5.Another factor that affects the controlled magnitude is the air temperature outside the greenhouse, which has a negative meaning in relation to the control goal. Other disturbances may be people in the greenhouse or other heating (cooling) objects, but the temperature of the external environment affects them more strongly than others.
Elements such as an executive mechanism, a sensor, a regulatory body, a comparable element may participate in a scheme with a functional structure. The only function of an amplifier-converter unit (KAB) is to magnify the input signal and convert it into another form (e.g., from an analog signal to a digital one); corrective mechanisms for now, because they are introduced only when the system is not working satisfactorily.
The listed elements can be combined into one control device or control object, for example, a regulator - it all depends on the structure of the system and the characteristics of the control. It is necessary to have an idea of an optional control system, so they will be present in a generalized scheme. We distinguish these features of the control system functional blocks:

1. The governing body is defined by this question – "with what does the controlling effect be effected directly on the object?" or what exactly does the controlling effect "permit" to carry out an effect similar to a controlling effect?
2. The executive mechanism (or device) can be identified if the question is asked: "How does the controller affect the controller?".
3. Sensor – the above description of this device was given, in essence this device is a "gauge" of magnitudes in the system. Therefore, in order to define a sensor, it is enough to answer this question: "By what is the variable or optional magnitude in the system measured?". Sensors can also be called rotators, because they convert the corrected signal into a form of electrical voltage that is convenient to enter into the control device.
4. An element of comparison is not difficult to determine by its name. This device has to calculate the difference between the signals or compare them in some other way, for example, by exceeding the permissible limit.

We distinguish these elements by the example of the scheme of the automatic control system for air ventilation in a greenhouse, discussed above.
1. The object (greenhouse) is "affected" by the air outside directly on the ground, the "window" is the "window" that gives "permission" to this effect, this window is the regulatory body.

Web of Technology: Multidimensional Research Journal
webofjournals.com/index.php/4

2. The window is affected by an electric motor, it opens or closes the window, so it is an executive mechanism.
3.The controlled magnitude is measured by the temperature sensor in the greenhouse.
4.The given temperature signal and the actual temperatures in the greenhouse are compared by the voltage between the conductors, so the voltmeter measuring this difference is called the comparison element in this case. The appearance of the functional circuit is shown in Figure 4.

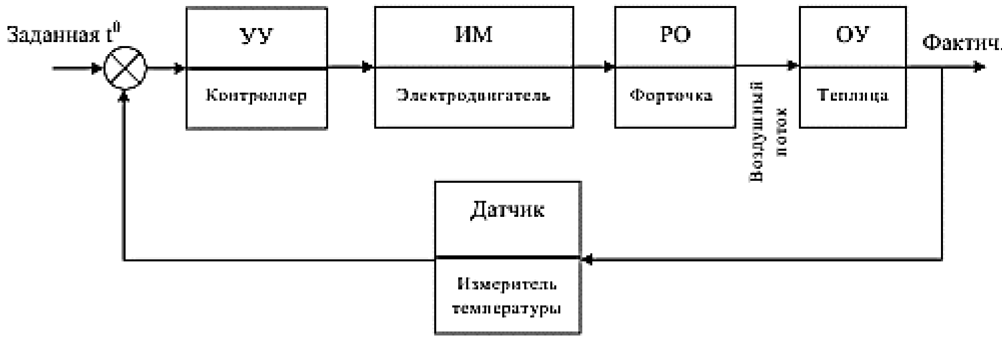

Figure 6. Functional scheme of greenhouse ABS

REFERENCES

1. Kh.O.Abdullaev, M.S.Bogdanovich, L.A.Volkov, V.G.Danilchenko, P.G.Ilmenkov. The Mechanism of Amplification and Kinetics of Photocurrent in Vertical Photoconductors Based on the Heterostructure of AlGaAs−GaAs // Physics and Technology of Semiconductors, 1987, Vol. 21, Issue 10, pp. 1842–1846
2. Kh.O. Abdullaev, V.I. Korolkov, M.V. Pavlovsky, E.V. Russu, T.S. Tabarov. Studies of planar photoresistances based on InGaAs/InP with a hidden p+-gate // Physics and Technics of Semiconductors, 1990, Vol. 24, Issue 11, pp. 1969–1972
3. Abdullayev Kh.O., Abdukhalimov I.I., «Influence of the roots of the characteristic equation on the transition process in automatic control systems». «Automation and the role of education in innovative technologies in solving energy problems aimed at improving energy efficiency of economic sectors and the social sphere». International conference. Namangan, 2021.
4. Khakim O.Abdullayev, Dilmurod T.Qodirov, «BASIC CONEPTS OF THE STATE SPACE METHOD,» в XI International Annual Conference "Industrial Technologies and Engineering – ICITE-2022, Shimkent, Kazakhstan, 2022.
5. Abdullayev Kh.O.,Toshpulatov Q.Ya.,Abdukhalimov I.I., "Social significance of production automation". «Role and tasks of development of technological process automation systems». International conference. Fergana, 2021.
6. U. Erkaboev, R. Rakhimov, J. Mirzaev, U. Negmatov, N. Sayidov. Influence of the two-dimensional density of states on the temperature dependence of the electrical conductivity oscillations in heterostructures with quantum wells // International Journal of Modern Physics B. 38(15), Article ID 2450185 (2024).
7. U.I. Erkaboev, R.G. Rakhimov. Determination of the dependence of transverse electrical conductivity and magnetoresistance oscillations on temperature in heterostructures based on

Web of Technology: Multidimensional Research Journal
webofjournals.com/index.php/4

quantum wells // e-Journal of Surface Science and Nanotechnology. 22(2), pp.98-106. (2024)

8. U.I. Erkaboev, N.A. Sayidov, J.I. Mirzaev, R.G. Rakhimov. Determination of the temperature dependence of the Fermi energy oscillations in nanostructured semiconductor materials in the presence of a quantizing magnetic field // Euroasian Journal of Semiconductors Science and Engineering. 3(2), pp.47-52 (2021).
9. R.G. Rakhimov. Clean the cotton from small impurities and establish optimal parameters // The Peerian Journal. 17, pp.57-63 (2023).
10. U.I. Erkaboev, N.A. Sayidov, U.M.Negmatov, J.I. Mirzaev, R.G. Rakhimov. Influence temperature and strong magnetic field on oscillations of density of energy states in heterostructures with quantum wells HgCdTe/CdHgTe // E3S Web of Conferences. 401, 01090 (2023)
11. U.I. Erkaboev, N.A. Sayidov, U.M.Negmatov, R.G. Rakhimov, J.I. Mirzaev. Temperature dependence of width band gap in InxGa1-xAs quantum well in presence of transverse strong magnetic field // E3S Web of Conferences. 401, 04042 (2023)
12. Kadirov D.T., Rasulev A.X., Gaibnazarov S.B., Nosirova S.Sh., Urmanov I.R. Improving The Safety Stability Of Algorithms For Recurrent State Estimation Based On The Methods Of Conditionally Gaussian Filtering // Turkish Journal of Computer and Mathematics Education. 2021. Vol.12, No.7, pp.3306- 3315
13. Kodirov D.T. Algorithms for sustainable adaptive evaluation of the state of the stochastic control objects // International scientific review. 2019. Iss. LVII, pp.25-26
14. D.T.Kodirov, F.M.Kodirova, B.Haydarov, U.Negmatov. Algorithms For Stable Estimation Of The Extended State Vector Of Controlled Objects // Solid State Technology. 2020. Vol.63, Iss.6, pp.14903-14909
15. D.T. Kodirov, F.M. Kodirova. Algorithms for joint estimation of the state vector and parameters of dynamical systems // Universum: technical sciences. 2021. Iss. 7-1(88), pp.66-68
16. Kodirov D.T. Algorithms of sustainable multistep assessment of the state of nonlinear stochastic systems // International Scientific and Technical Journal "Chemical Technology. Control and Management". Tashkent, Tashkent State Technical University. №5, 2017. - pp. 66-71.
17. Dilmurod Qodirov, Mukhammadziyo Ismanov. Stable algorithms for the identification of delayed control objects based on input and output signals // AIP Conference Proceedings. 2024. Vol.3045, Iss.1, 030103
18. Ismanov Muhammadziyo, Mirzaikromov Xamidilloxon. Data collection system in the management of technological processes // International journal of advanced research in education, technology and management. 2023. Vol.2, No 6, pp.236-243
19. Mukhammadziyo Ismanov, Abdusamat Karimov. The action of shock waves on cylindrical panels // AIP Conference Proceedings. 2024. Vol.3045, Iss.1, 030101
20. Abdusamat Karimov, Mukhammadziyo Ismanov. Analysis of errors of optoelectronic moisture meters // International journal of advanced research in education, technology and management. 2023. Vol.2, No 5, pp.391-401

21. Karimov A.I., Ismanov M.A. Modeling the Method of Linear Approximation of Signals in SPLC (Sensor Programmable Logic Controller) // International Journal on Orange Technologies. 2021. Vol.3, Iss.10, pp.55-59
22. Sh. Djuraev, D. To'xtasinov. Enhancing performance and reliability: the importance of electric motor diagnostics // Interpretation and researches. 2023. Vol.1, Iss.10
23. Sharibaev N.Yu., Djuraev Sh.S., Toxtasinov D.X. Priorities in determining electric motor vibration with ADXL345 accelerometer sensor // Al-Farg'oniy avlodlari. 2023. Vol.1, Iss.4, pp.226-230
24. A.A. Mamakhanov, Sh.S. Juraev, N.Y. Sharibaev, M.E. Tulkinov, D.Kh. Tukhtasinov. Device for growing hydroponic feed with an automated control system // Universum: technical sciences. 2020. No 8-2 (77), pp.17-20
25. D. To'xtasinov. Mathematical model of the relationship between the vibration of the electric motor and the defect in the bearing // Interpretation and researches. 2024. Vol. 2, Iss. 11, pp.75-78
26. D.Kh. Tukhtasinov, M.A. Ismanov. Improvement of the control system of the ammonia synthesis column based on fuzzy logic // Economics and Society. Vol.12, Iss.55, pp.1236-1239
27. Djuraev, A., Sayitkulov, S., Rajabov, O., Kholmirzaev, J., & Haydarov, B. (2022, December). Analysis of the impact effect of a piece of cotton with a flat surface with a multi-sided grates slope. In Journal of Physics: Conference Series (Vol. 2373, No. 2, p. 022048). IOP Publishing.
28. Juraev, A. D., Kholmirzaev, J. Z., & Khaidarov, B. A. (2022). Development of an effective design scheme of grates on elastic supports and optimization of the parameters of the cotton cleaner. Mechanics and Technology, (Special Issue 2), 9-15 betlar.
29. Haydarov Bakhtiyor Abdullajon oglu. "Study of the effect of multifaceted piles on cotton quality indicators in the process of cleaning cotton from fine waste. Journal of New Century Innovations 19.2 (2022): pp. 137-141.
30. Haydarov is happy. "An Analysis of the Effect of Improved Pile Drum on Fine Dirt Content." Creative Teacher 2.20 (2022): pp. 7-9.
31. M.A. Ismanov, B.A. Khaidarov, I.U. Ibragimov, S.Kh. Kirgizova. Organizational System of Management of Entrepreneurial Activity // Economics and Society. 2019. Vol.12, Iss.67, pp.498-501
32. D. Kodirov, A. Askarov. Algorithms for synthesis of observing devices based on operator representation of external forces // AIP Conference Proceedings. Vol. 2789, No. 1, 040121.
33. A.A. Askarov. The Role of the Fuzzy Logic Method in Detecting Fires in Production // Best Intellectual Research. 2023. Vol. 10, No. 3, pp.126-130.
34. A.A. Asqarov. The importance of the MQ-2 sensor in fire detection // International journal of advanced research in education, technology and management. 2023. Vol. 2 No. 6, pp.264-269
35. A.A. Askarov. Develop a structure and basic diagram of a microprocessor control and data processing unit. International journal of advanced research in education, technology and management. 2022. Vol.19, Iss.2, pp.107-113

Web of Technology: Multidimensional Research Journal
webofjournals.com/index.php/4

36. S. Ruzimatov, A. Asqarov. Mathematical Model Of Textile Enterprise Sales Prevention // Texas Journal of Multidisciplinary Studies. 2022. Vol.8, pp.88-90
37. Toshpulatov K. Management: Nature and Structure of Organizations, and the Role of Organizational Management. 2023. Vol.1, Iss.11, pp.279-282.
38. Toshpulatov K. Sovremennaya teoriya upravleniya: novye podkhody i metody [Modern management theory: new approaches and methods]. 203. Vol. 6, Iss. 5, pp.288-292.
39. Nasritdinov B., Toshpulatov K. Automation of the Economic System: Evolution and Prospects. 2023. Vol. 1, Iss. 2, pp.485-489.
40. Nasritdinov B., Toshpulatov K. Economy of the Future: How Automation Will Change the Structure of Production. 2023. Vol. 1, Iss. 12, pp.25-28.
41. N. Parpiyeva. Automatic control system of pressing equipment parameters // Ethiopian International Journal of Multidisciplinary Research. 2024. Vol.11, Iss,3, pp.147-153.
42. Kh. Parpiev, A.B. Gafurov, P.D. Lastochkin, N.Kh. Parpieva. Durable superhydrophobic cotton fabric for filtration of oil-water mixtures // Technology of the textile industry. 2023, № 2 (404), pp.83-91
43. Adkhamjon G., Bilolxon T. Preparation and application of colored antibacterial cotton fiber based on microstructural control // 7th-ICARHSE. International Conference on Advance Research in Humanities, Applied Sciences and Education. 2022. pp.9-13
44. Yakubjanov A. Structure and characteristics of the expert system // Interpretation and researches. 2024. Vol. 11, Iss.33, pp.59-65.
45. Yokubzhanov A. Role of automation in improving the efficiency of technological processes // Education News: Research in the XXI Century. Vol. 1, Iss. 12, pp.51-54.
46. Rakhimov Y.T., Yokubzhanov A.O. Pollution of natural environments in the Republic of Uzbekistan and ways to solve them. 2017. pp. 25-28
47. X.Madaliyev. Creation of interface through app design of matlab software for automatic determination of loads on roller machine worker shaft // Interpretation and Researches. 2023. Vol.1, Iss.10.
48. Sh.S.Djurayev, X.B.Madaliyev. Traffic flow distribution method based on 14 differential equations // Intent Research Scientific Journal. 2023. Vol.2, Iss.10, pp.1–10.
49. B.A. Khaidarov, Kh.B. Madaliev. Improvement of the technology of cleaning raw cotton from small weed impurities // Economics and society. 2022. Vol. 4(95)-1, pp.561-564.
50. Kh.B.Madaliev, D.X. Tukhtasinov. Development of an openness profile for a logical control system for technological equipment // Ijodkor o'qituvchi. 2022. Vol.2, Iss.20, pp.215-217
51. M.Ismanov, A.Asqarov, H.Madaliyev, D.Fayzullayev. Theoretical and experimental study of the law of distribution of non-stationary heat flux in raw cotton stored in the bunt // AIP Conference Proceedings. 2023. Vol.2789, Iss.1, 040106.
52. son of Yu.A.Valijon, son of J.E.Shavkat, son of S.H.Hakimjon, son of M.F.Farkhad. Models of Knowledge Visualization in Artificial Intelligence // Research. 2023. Vol.28, Iss.5, pp.22-30.
53. son of Y.A.Valijon, son of N.Y.Saydulla, son of N.S.Shavkat, son of Kh.S.Ubaydulla. Building non-rigid control systems using the Fuzzy Module // Research. 2023. Vol.28, Iss.5, pp.31-37.

54. Son of Y.A.Valijon, son of H.R.State, son of G.A.Tirkash. Sugueno-type system design using fuzzy logic // Journal of new century innovations. 2023. Vol.43, Iss.2, pp. 97-106
55. A.V. Yuldashev. The principle of forming an intellectual model of diagnosing object states // Ekonomika i sotsium. 2024. Vol. 3(118)-2, pp.436-440.
56. D.Z.Fayzullayev. Mexbios development studio software package for developing control programs and modeling electric drive systems // Web of scientist: International scientific research journal. 2022. Vol.3, Iss.5, pp. 1964-1967
57. D.Fayzullayev, S.Ruzimetov. Develops an Alarm System in the Alarm Bath and an Adaptive Power Adjusment System // International Journal on Orange Technologies. 2021. Vol.3, Iss.12, pp.178-182. https://dx.doi.org/10.31149/ijot.v3i12.2537
58. A.N. Sharibaev, R.N. Sharibayev, B.T. Abdulazizov, M.R. Tokhirjonova. Problems in the field of deep learning with reinforcement // Forum of Young Scientists. 2023. Vol.6, Iss.82, pp.420-422
59. E.Sharibaev, O.Sarimsakov, R.Sharifbaev. Process monitoring of devil machine electric engine in cotton primary processing enterprises // AIP Conference Proceedings. 2023. Vol.2700, Iss.1, 050024
60. R.N. Sharibaev, Sh.S. Juraev, M.R. Tokhirjonova. Improving the classification by cocoon varieties using convolutional neural networks. 2023. Vol. 6, Iss.96, pp.212-214.
61. R.N. Sharibaev, R.N. Sharifbayev, S.S. Sharipbaev. The problem of semiconductor sensors in mechatronic systems // International Conference on World Science and Resarch. 2024. Vol.1, Iss.2, pp.5-8.

1. N.Y. Sharibaev, A. Ergashev, A. Mamadaliev, R.N. Sharifbaev, S.Kh. Kirgizova. Study of the light scattering spectrum using delta functions. 2019. Vol.12, Iss.67, pp.1150-1153.