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ACTUAL PROBLEMS OF AUTOMATION OF TECHNOLOGICAL PROCESSES AND PRODUCTION AND APPLICATION OF FUZZY LOGIC AS A SOLUTION

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ABSTRACT

This article examines the automated control model of the production of construction materials, which provides an opportunity to obtain the optimal structure based on the criterion of reliability.

Keywords: automation, process, construction, reliability.

Once manufacturing companies enter the production phase in integrated cooperation on the Internet, the creation of an intellectual device and database network for collecting and transmitting data transmitted by initial systems-level production management systems is becoming increasingly relevant.

This new generation production organization form allows you to create a complete cycle that depends on the information obtained in production, from the "working" level of production to enterprise-level supply chain management (SCM — supply chain management) and product life cycle management (PLM — product life cycle management).

The systems that manage production processes, equipped with a new generation of software, serve in their place as intermediaries that distribute information processing operations. Various technological components of industrial automation systems will be integrated into a new generation of enterprise automation packages.

Industrial-standard medium application interfaces such as COM/DCOM/OPC, which can be used in computer-based systems, are the primary motivation for this integration. The development of enterprise automation methods will lead to the creation of a single environment in the future that combines open architectures based on personal computers, installed systems, web services, programmable controller, communications tools and component software technologies, such as a cloud production network, and the basis of such an environment is the refusal to use non-integrated software and tools will be a model.

Problem put: Any highly complex automation object must be represented by a set of hierarchical technological subsystems that are combined with an algorithm to match the structure of the appropriate control system. The main problem in this case is the establishment of interactions between subsystems [2,3].

Division into functional nodes depends on the construction of general complex technology on the basis of less complex tasks at the bottom, each device in the technological node is relatively autonomous, and interactions are made in a central way across high-end ostipizims or

horizontal functional logical connections. With the complexity of the system, the issue of ensuring functional reliability without allowing the ossuves to re-repeat will become relevant.
Traditional measures to increase reliability are aimed at improving the supply of devices and tools (copying, complicating algorithms, and updating devices and tools) often do not yield sufficient efficiency due to the principle that efficiency and reliability for hierarchical systems are regulated by the weakest joint.
The basics of ensuring reliability based on the nature of the automation tasks of such objects include:

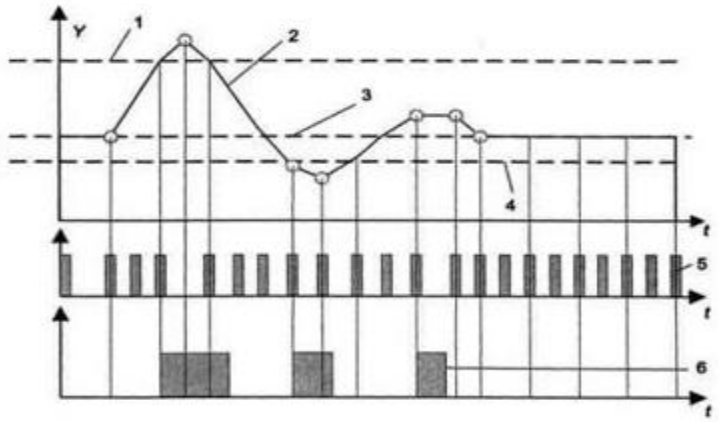
1) single malfunctions in the system should not lead to violations of basic technological functions;

2) management algorithms and applications must have a modular structure built in accordance with the standards of open systems;

3) preferably the heterosexual interaction of ossity levels;

4) the problem will be required to provide the possibility of autonomous systematic restoration of the joint from which the problem occurred. The throat where the problem occurred must be restored (replaced, copied or disconnected) without affecting the rest of the system. The control algorithm must "process" the malfunction and distribute the functions of the failing joint to the modified structure.

Therefore, increasing efficiency by changing the hardware implementation of the algorithm is not always successful. Additional expenses also require the modernization of the hardware structure. A feature of automation of technological connections of modern production is the sequence of tasks that make up the work process and the gradualness of transitions between them.
The multi-mode operation of machines requires the construction of fixers that implement variable algorithms depending on the mode of control. A multi-mode system can be considered as a logical device with a limited number of discrete situations - modes, each of which imposes specific requirements on the control process.
The exchange of modes is carried out through control signals in accordance with current information about the controlled object or state of the process. Thus, each case matches its own corrector (logical or hardware), and each implements its own local algorithm [1].
The structure and parameters of the local moditor are selected in accordance with the requirements usually imposed on the system in current mode. The structure of the modifier (Figure 1) consists of a block of macroorgaming and a block of accurate calculations of the purpose function to determine whether it belongs to the collection [4]. Figure 2 shows the calculation nomogram (decision-making) when the purpose function is achieved at the required time, indicating that the calculation time is divided into two functional blocks: the macro-computing block and the goal function parameters into a specific calculation block. Theprocess of B increase is divided into streams divided according to the accuracy and priority level.
In the presence of expert knowledge about the progress of the process, the use of ambiguous logic (fuzzy logic) and its mathematical operator allows you to reduce the number of calculations and divide them into two streams of accurate and ambiguous conclusions.



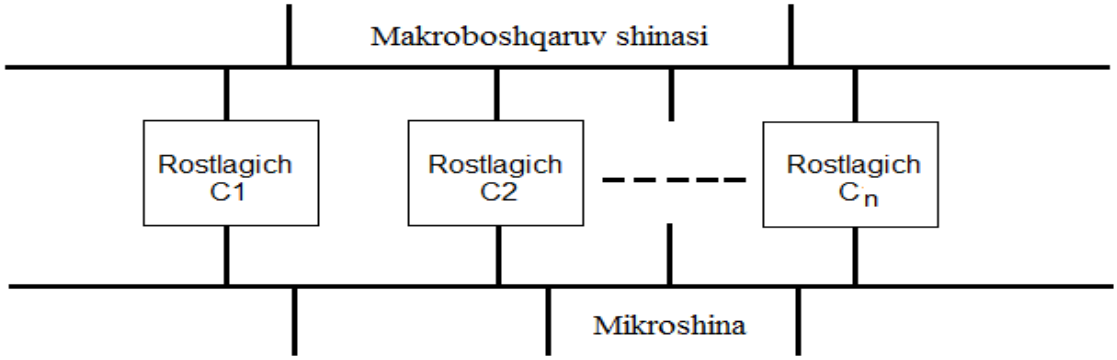
Picture 2. Functionality chart of the editor.

1st upper limit; 2 controlled process; 3- optimal control zone; 4th lower bound; 5th macro-counting; 6- PID-Fixer

The system, built only in one of the computational blocks, will result in the system's performance, stability and high management as a result of such an organization of management. Thus, a multi-mode system can be expressed by independent fixer algorithms and structural modification phases. In general, the order of change is determined by the progress of the algorithm and the conditions of the technological process (Figure 2).

On the other hand, the use of microprocessor systems makes it possible to implement control systems with a changing hierarchical structure. This is due to the simplicity of algorithms implementing software and the ability to use different networks or controllers of the common application as local regulators (Figure 3).

Changes are made to the logical structure, a peer-to-peer system remains in terms of hardware maintenance (Figure 3), where data and commands are transmitted through two parallel tires. In the process of performing technological operations of management, a hierarchical principle is carried out in accordance with the algorithms of the structural stages of macrogrogulators.



Picture 3. The ability to use different networks or controllers of the general program as regulators

The use of automation systems in management using distributed algorithms required the development of principles to ensure reliability. Therefore, the principle formulated by Fon Neyman is fit for purpose: "When building complex computers, you should not work with unreliable components by increasing their reliability. They should be organized in such a way

that the reliability of the whole computer is greater than the reliability of individual parts of it[3]. This principle applies to any complex computing processes.

There are several reasons why multi-component regulator configuration outweighs other possible configurations. Most valuablely, in terms of the current trend of integration of various information systems and computer technologies, the superfluous idea of regulators (information systems) remains attractive for the calculation of automatic control systems at all levels. If one regulator (control principle, algorithm) is used instead, then repetition at the component level occurs and in the process of operation the wrong components of the system cannot be excluded. Therefore, the important task in the automation of production management remains the rational selection of the configuration of the structure. Depending on the developing technological situation, increasing the efficiency of automation through algorithmically changing architecture is becoming increasingly important.

LIST OF AVAILABLE PUBLICATIONS

1. Barkalov S.A., Nguyen Van Zhang, Nguyen Thanh Zhang. Algorithm for calculating the time parameters of the graph and forecasting the completion date of the simulated process // Control Systems and Information Technologies. No. 3.1 (53). 2017. — C. — 116-119.
2. Belousov V.E. Algorithm for operational determination of the states of objects in multilevel technical systems [Text]/ Belousov V.E., Konchakov S.A.// Economics and management of control systems. № 3.2 (17). 2015. — C. 227-232.
3. Belousov V.E. Algorithm for analysis of solution options in multi-criteria problems [Text]/ Aksenenko P.Yu., Belousov V.E., Konchakov S.A.// Control systems and information technologies. №4(62), 2015. – S. 31-33.
4. Islamnur, I. (2021, April). Implementation of temperature adjustment in the oven working zone with infinite adjustment. In Archive of Conferences (Vol. 20, No. 1, pp. 94-96).
5. Islamnur, I., Murodjon, O., Sherobod, K., & Dilshod, E. (2021, April). Mathematical account of an independent adjuster operator in accordance with unlimited logical principles of automatic pressure control system in the oven working zone. In Archive of Conferences (Vol. 20, No. 1, pp. 85-89).
6. Islamnur, I., Ogli, F. S. U., Turaevich, S. T., & Sherobod, K. (2021, April). The importance and modern status of automation of the fuel burning process in gas burning furnaces. In Archive of Conferences (Vol. 19, No. 1, pp. 23-25).
7. Nurullayevich, K. S., & Islomnur, I. (2022). SELF-REGULATORY CONTROL SYSTEM FOR FURNITURE FIRE. Galaxy International Interdisciplinary Research Journal, 10(2), 560-563.
8. Sevinov, J. U., Mallaev, A. R., & Xusanov, S. N. (2021). Algorithms for the synthesis of optimal linear-quadratic stationary controllers. In World Conference Intelligent System for Industrial Automation (pp. 64-71). Springer, Cham.
9. Ibragimov, B. Sh., & Eshkobilov, S. B. (2021). The main characteristics of discrete technological processes of mass production as objects of automation. CENTRAL ASIAN JOURNAL OF MATHEMATICAL THEORY AND COMPUTER SCIENCES, 2(5), 42-47.
10. Ochilov, M. A. (2018). Introduction of automated systems of operational production management at oil refineries. In The Field of Knowledge: Issues of Productive Interaction

of Theory and Practice (pp. 219-223).
11. Mukhitdinov, K. S., & Rakhimov, A. M. Providing accommodation and food services to the population of the region. International Journal of Trend in Scientific Research and Development (IJTSRD), eISSN, 2456-6470.
12. Ochilov, M. A., Juraev, F. D., Maxmatqulov, G. X., & Rahimov, A. M. (2020). Analysis of important factors in checking the optimality of an indeterminate adjuster in a closed system. Journal of Critical Review, 7(15), 1679-1684.
13. Kalandarov, P. I., & Aralov, G. M. (2021). Investment attractiveness is the successful implementation of innovative developments that work in real time. Innovation technologylar, (2 (42)), 88-91.
14. Kalandarov, P. I., Makarov, A. M., & Aralov, G. M. (2021). Features of automated measurement of moisture of grain crops in the field. Izvestiya Volgogradskogo gosudarstvennogo tekhnicheskogo universiteta, (1), 60-63.
15. Аралов, Ғ. М. (2022). ИШЛАБ ЧИҚАРИШДА ЕНГИЛ САНОАТИНИНГ КЛАСТЕР УСУЛИ ИННОВАЦИОН ИҚТИСОДИЁТНИНГ АСОСИЙ ЙЎНАЛИШИ СИФАТИ. Educational Research in Universal Sciences, 1(6), 138-142.
16. Mallayev, A., Sevinov, J., Xusanov, S., & Boborayimov, O. (2022, June). Algorithms for the synthesis of gradient controllers in a nonlinear control system. In AIP Conference Proceedings (Vol. 2467, No. 1, p. 030003). AIP Publishing LLC.