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UPGRADE OF CYBERNETICS IN MODERN SCIENTIFIC DISCOURSE

АПГРЕЙД КІБЕРНЕТИКИ У СУЧАСНОМУ НАУКОВОМУ ДИСКУРСІ

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Abstract. *The author considers upgrade of cybernetics at the present stage of its development. It is noted that first-order cybernetics studied observed systems, second-order cybernetics was dealing with observing systems, and third-order cybernetics studied the processes occurring in the subject-polysubject environment – cyberspace. The author grounds the appropriateness of using the notion of hyphspace as metaphorical abstraction, which is a virtual reality (a component of the Noosphere) that exists inside the computer networks (the subject-polysubject environment). The conclusion has been made that hyphspace at the present stage of development of cybernetics is becoming the basis for its subsequent (but not final) upgrade – fourth order cybernetics. Cybernetics as a science proves to be moving from cognizing human-machine systems to the formations with growing human-dimensionality, which is manifested in the persistent increase in the number of users-nomads, who constantly observe themselves and others on the networks.*

Key words*: upgrade, cybernetics, cyberspace, hyphspace, subject-polysubject environment, Synergetics, control, nomads.*

Introduction. The development of artificial machines and mechanisms, information and computer technologies, as well as their high-speed involvement in all areas of life caused the formation of a separate branch of science – cybernetics, which appeared in the 40's of the 20th century and was designed to investigate these processes. Since the appearance of first artificial devices and mechanisms (machines, apparatus), the man has faced the problem of their management, that is, control. As to **first-order cybernetics,** it studied observed systems. The dominant role in the research belonged to atomistic ideas and an analytical approach to the study of Nature, because the basic objects of this rationality and the "subject-object" paradigm were systems (simple and complex). The total features of their parts determined the features of the whole, and the connections that arose as a result of their interaction could be explained by Laplace's determinism. They were homeostatic, with a functioning program that created controlling commands and corrected the action of the system based on feedback [8, c. 29-35).

Obviously, that was a kind of upgrade of cybernetics: from the observed systems (the object-object and the subject-object paradigms) to the observing systems (the subject-subject paradigm), namely to **second-order cybernetics** dealing with observing systems. For it, the important feature of objects was its (their) activity, and the causality for this type of objects was not limited to Laplace's determinism, but was supplemented by the ideas of "target causality", which can be attributed to the category of active systems (self-developing). The specificity of the "subject-object" relationships in activating the object-researcher led to recognizing their limitations,

focusing researchers on the paradigm of "subject-subject" relationships. Simultaneously, the formation of active systems as the basic type of objects to control complexity predetermined the development of second-order cybernetics, whereas the interdisciplinary approach became a leading one. But later, with the emergence of cyberspace, the paradigm of "subject-subject" relationships could no longer satisfy the needs of researchers to explain the processes occurring in this environment, which predetermined further upgrade – cyberspace was being formed and, ultimately, the Internet (with the advent of observers – neo-nomads), that is, **third-order cybernetics.** It studied the processes occurring in the "subject-polysubject" environment – cyberspace which was not dealing with systems, but with non-linear open formations – a network of observing systems. However, recently it undergoes certain changes: cyberspace, which could be interpreted as a rhizome before, is transforming into hyphspace, that is, **fourth-order cybernetics**.

The above-mentioned considerations have predetermined the relevance of our study, the scientific novelty of which lies in the attempt to correlate the stages of the development of complexity and the processes of controlling simple and complex systems, as well as the environment (hyphspace) with the periodization of the development of science proposed by V. Stepin [14]. The accentuation of these stages is grounded on the position and the meaning of the subject-observer in the background of the upgrade (modernization, renewal, including both software and hardware) of cybernetics in the complexity that is occurring too fast, it is similar to Moore's law: the density of transistors in microprocessors doubles every 18-24 months [17].

Thus, the constant development of technology is accompanied by peculiar upgrade of cybernetics. Therefore, it is appropriate to make a thorough analysis of the current development of cybernetics and its position in modern scientific discourse, and outline it as a priority task of our study.

Main material presentation. The classical period of science development is characterized by the fact that the basic objects of this rationality and the paradigm of the "subject-object" are systems (simple and complex). The total features of their parts determine the features of the whole, and the resulting connections can be explained by Laplace's determinism. They are homeostatic and have a functioning program which creates controlling commands and corrects the action of the system based on feedback [8, c. 29-35].

Thus, almost all problems of control were the object of the study of cybernetics (*Gr. κυβερνητική, Eng. cybernetics, Germ. kybernetik – the art of the helmsman)* – the science of general peculiarities of control processes and information transmission in machines, living organisms and society [20].

The French philosopher and sociologist E. Morin attempted to consider the historical development of machines, as well as how they were created. For instance, in the work "Method: The Nature of Nature", he noted, that an artificial machine "appeared as a result of the development of anthropo-social megamachine and is one of the aspects of its development" [12, c. 204]. Considering artificial machines, he analyzed in detail the history of their appearance.

At the first stage of society's development, people exploited the labor force and

production capabilities of living motors – machines (animals and people). Eventually, there appeared mills: air and water; and that became a fundamentally new link between humanity and physical nature. When mechanisms and clock devices (the 13th century) went into effect, automatic mechanisms were constructed for performing more precise, thin and various operations, which were built up in chains repeatedly locked up in themselves; thus, in the 18th century the production of automatic machines began [12, c. 205]. Consequently, along with the development of productive functions of artificial machines, their organizational functions were expanded as well as their autonomy.

In the modern scientific discourse concerning first-order cybernetics, it is stated that it dealt with self-regulating control systems, but the approaches to their study remained linear. The basis for first-order cybernetics was a linear mechanistic thinking [7, c. 45]. "Classical cybernetics can be considered as one of the last pillars of scientistic thinking, oriented on the "subject-object" relationships of humans with the world, on subjugation of nature which seemed an irreversible consequence of scientific and technological progress" [1, c. 40-41]. First-order cybernetics arose when "complex adaptive systems realized how to organize, control and restore physical complexity" [18, c. 59].

Thus, first-order cybernetics was limited to the study of basic objects of classical scientific rationality with the use of linear approaches to their study and the paradigm of "subject-object" relationships within systems. It was considered as a science about general laws of processes of control and accumulation, storage and transmission of information in machines (physical complexity), living organisms and society. However, first-order cybernetics did not satisfy the requirements of non-classical scientific rationality. Obviously, certain upgrade of cybernetics happened: from the cybernetics of observed systems (the paradigm of "subject-object") to the observing systems (paradigm "subject-subject"). Let us consider it in more detail.

The non-classical period of development of science takes into account the connection between knowledge about the object and the nature of means and operations of activity in transition from the paradigm "subject-object" to the paradigm "subject-subject", which resulted in the formation of ideas about new types of control such as active systems [2], informational [6], reflexive [11] as well as the problem "tools determine the object" [11].

The problem of such a correlation can be considered from the point of **diversity and perfection.** Proceeding from the first, John von Neumann testified that "complexity" at its lower level is a phenomenon that may be fraught with degeneration. Each machine capable of producing others (object-object – I. K.), will produce only less complex machines. However, there is a certain minimum level, from which this tendency to degeneration ceases to be general. Only overcoming this level makes it possible to create machines that reproduce themselves or acquire the ability to produce more complex things. Thus, the complexity at the level of the living (subject-subject) is a phenomenon of either degeneration or the ability to grow. Living organisms reproduce themselves, that is, create new organisms without reducing complexity. Furthermore, there are long periods of evolution, during which the complexity even increases [13, c. 22], below a certain minimum level it

degenerates, and above this level it can become self-sustaining and even acquire the ability to grow [13, c. 27].

Consequently, John von Neumann found out that the complexity of inanimate systems (object-object) is perceived as a function of their diversity and the function (non-linear) of the number of elements and subsystems. In addition, there must necessarily appear objective preconditions, in which the change in the diversity (complexity) will begin to correlate with changes in the relative organization of the system. Instead, complexity in living systems is explained by the processes of degeneration, self-sustainability, or the ability to grow under objective circumstances. As we see, the objects of the study were not removed from the environment of their existence; they were not divided into simple systems, but were investigated from the point of diversity in the integrity and totality.

In addition to the aforementioned, it is necessary to dwell on V. Lefebvre's concept which he introduced in his work "Conflicting Structures"; here he singled out a special class of objects, which he called "objects that can be compared with the study on perfection" [10, c. 9-10]. The researcher should reflect their "inner world" and master the special means – reflexive. At the same time, the boundary between the object and the researcher, as well as the external observer, is eroded. Thus, the concept of "self-objectification" became commonplace for first-order rather than second-order cybernetics [10, c. 9-10]. The differences between the object and the researcher disappear, since the object itself becomes a researcher (at the same time there happen difficulties in considering the researcher from the position of the object!). Subsequently, these ideas were developed in the monograph "Algebra of Conscience" [9], in the fundamental positions of social cybernetics [19] and others.

In the article "Cybernetics of Cybernetics", the Austrian and American physicist Heinz von Foerster (1979) noted that first-order cybernetics is the cybernetics of observed systems and second-order cybernetics – of observing systems make the boundary between the subject and the object of control and, as a result, between a set of subjects and the environment as a whole. Second-order cybernetics developed when "living systems realized how to self-organize, to self-control and to restore biological complexity" [18, c. 59].

Thus, for **a non-classical type of scientific rationality** and a basic "subject-subject" paradigm of control, the important feature of objects is their activity, and the causality for this type of objects is not reduced to Laplace's determinism, but is supplemented by ideas of "target causality", which can be attributed to the category of active systems (self-developing). The specificity of the "subject-object" relationships with activating the object-researcher led to the recognition of their limitations, focusing researchers on the paradigm of "subject-subject" relationships (biological complexity). At the same time, the formation of active systems as a basic type of control objects predetermined the development of second-order cybernetics, when the leading approach became interdisciplinary. But later, with the emergence of such formation as cyberspace, the paradigm of "subject-subject" relationships could no longer meet the needs of researchers to explain the processes occurring in this environment, which gave rise to post-classical scientific rationality. Cybernetics upgrades further – cyberspace is formed (coordinated hallucinations of subjects in the

world of computer networks) and, finally, the Internet (with the advent of observers-nomads).

Developing, the concept of complexity was supplemented by discoveries in the field of statistical physics and kinetic theory of gases (as the ratio of complexity and organization) and cybernetics (*the concept of hierarchy and the idea of the level organization of systems*). With the onset of self-reproduction of machines and the involvement of man (neo-nomad) in cyberspace, there appeared a problem of controlling processes that occur simultaneously in machine-machine (object-object), human-machine (subject-object) systems and "subject-subject" environments.

Thus, developing, cybernetics moves from cognition of man-machine systems to formations where "the presence of a man, his will and goal-setting are an integral part" [7, c. 55]. In fact, in cybernetics of higher order we have to observe exactly these processes.

The post-non-classical period of the development of cybernetics as a science is connected with the ideas of cyberspace, which is undergoing significant changes. Therefore, it is appropriate to specify this term with several definitions. The first was proposed by the "father of cyberpunk", the Canadian science fiction writer W. Gibson in a short story "Burning Chrome" (1982), where for the first time the concept of "cyberspace" appeared. Later, in his novel "Neuromancer" (1984) he formulated the definition of **cyberspace** as "a consensual *hallucination experienced* daily by *billions* of legitimate *operators* in every nation" [3]. Thus, the global network is a "consensual hallucination", a cyberspace beyond which there are no points (cities, museums, libraries, etc.) that we virtually visit, instead there are only lines – communication channels (communications), which join Web pages requested by users. In its original meaning, "cyberspace" involves users but only as subjects of cognition.

The second definition: **cyberspace** is a metaphorical abstraction used in philosophy and in computer technologies, a (virtual) reality representing the Noosphere [15, c. 203]. Namely, it is another world which exists both inside the computers and inside the computer networks.

Summarizing the aforementioned definitions it is possible to state that cyberspace is a coordinated hallucination of subjects in the world of computer networks as subjects of cognition, the subject-polysubject environment. Cyberspace is studied by third-order cybernetics; its difference from the previous stages lies in the fact that the subject of its study is no longer a system but a network. G. Deleuze and F. Guattari (1987) emphasize this peculiarity of the network in the chapter "Rhizome" of their fundamental work "A Thousand Plateaus: Capitalism and Schizophrenia": viewed as an autonomous module, outside connections with others, the computer itself cannot be a rhizomatic entity, since it is designed as a specific hierarchical structure, where "power is granted to a memory or central organ" [16, c. 16]. As for **third-order cybernetics**, it deals not with systems but with a nonlinear open formation, a network of observing systems. Third-order cybernetics appeared when "consciousness learned to integrate all complex adaptive systemic intellects (environmental, artificial, etc.) in order to withstand and restore the complexity of a complex adapted system [18, c. 59].

However, lately **third-order cybernetics** is undergoing changes as well: the cyberspace, interpreted as a rhizome, is being modified, transforming into a hyphspace, namely, it is expanding its boundaries to the size of environments. Gilles Deleuze and Felix Guattari (1987) considered the limited network of machines with the connection from one subject to another (communicative) as the prototype of a rhizomatic plurality with horizontal (interspecific) and plane connections. Routes are not defined in advance, and all participants are interchangeable, so the coordination of local operations and synchronization of the final overall result is achieved without the central organ [16], which is, in our opinion, characteristic of the "radix" [5, c. 159] – a sederant operating in a simple or complex system.

This is the way third-order cybernetics turns into **fourth-order cybernetics**, since it considers cyberspace as a component of **hyphspace.** This metaphorical abstraction can be used when it comes to philosophy and computer technology. It represents a virtual reality that is part of the Noosphere. This is a world of another nature that is generated by computer networks with the active involvement of users who, strolling through the websites, observe themselves and others. Without changing the location of their bodies, they are constantly moving through the sites, and therefore they can be called neo-nomads. That is, **fourth-order cybernetics** studies not only simple and complex systems and networks but also environments. Cyberspace, similar to the radix and the rhizome, extends its boundaries, and becomes an integral part of hyphspace. That is, cyberspace, in contrast to hyphspace, includes processes occurring both inside computers (radix) and inside computer networks (rhizome) with the involvement of an observer – nomad (an inventor, a repairman), and hyphspace (hypha) [4, c. 59-60] – with the involvement of the user – neo-nomad (who roams the Internet sites and observes himself and other users).

Thus, the networks is a complicated neo-nomadic hyphical non-sustainable decentralized formation, which is constantly evolving both in horizontal and vertical planes and nobody controls it (for the present, or it may only seem to us that nobody controls it). This network is self-born and continues self-developing (or it seems to us) as the informational and communicative nomadic environment of Gilles Deleuze and Felix Guattari (1987), which, having transformed into complexity, has turned into hyphspace, and exists only with one user–neo-nomad at least present as a subject of cognition (a self-observer of complexity and an observer of others).

In the environments that are developing in complexity, there are created certain preconditions for polyvariability of ways of development and self-organization. In the future, it will probably enable the creation of environments with predetermined parameters, as well as the control of the processes occurring in them.

Conclusions. Having considered contemporary development of cybernetics, it is possible to state that upgrade accompanies it: **in the classic period – first-order cybernetics** studied the observed systems (paradigm "object-object" and "subject-object") and the observing systems (paradigm "subject-subject"); **in the non-classical period – second-order cybernetics** explored the observed systems and the theory of observing systems (subject-object, subject-subject) which dealt with observers; **in the post-non-classical period – third-order cybernetics** studied the systems ranging from with the observing systems (subject-subject) to self-developing

environments (subject-polysubject) with the obligatory presence of a human (a nomad and a sederant) and hyphspace (with a neo-nomad-observer, a user (users-neonomads), a subject (subjects) of cognition in human-dimensional combined networks (subject-polysubject environment) with increasing human-dimensionality (subject-subject). Eventually, this polyvariability of possibilities of controlling the environment due to new discoveries in science will allow creating environments with predetermined parameters, and also controlling the processes that occur in them, it means we deal with **fourth-order cybernetics** based on hyphspace, which is a nomadic formation inside computer networks.

Consequently, **hyphspace** is a metaphorical abstraction, which is a virtual reality – a component of the Noosphere. This is a world that exists in computer networks with the active involvement of *observers-nomads* (nomads roaming the Internet sites), who are subjects of cognition. The hyphspace at the present stage of cybernetics development is the basis for its subsequent (but not final) upgrade – **fourth-order** cybernetics. Obviously, cybernetics as the science is moving from cognition of human-machine systems to formations with increasing human-dimensionality, namely, human presence is growing – the time of the stay, the speed of information retrieval, access to sites, number of users-neonomads, who constantly observe themselves and others on the networks.

Література:

1. Бевзенко Л. Д. Социальная самоорганизация. Синергетическая парадигма: возможности социальных интерпретаций / Л. Д. Бевзенко. – К.: Институт социологии НАН Украины, 2002. – 437 с.

2. Бурков В. Н. Механизмы функционирования организационных систем / В. Н. Бурков, В. В. Кондратьев. – М.: Наука, 1981. – 384 с.

3. Гибсон У. Нейромант : фантастический роман / У. Гибсон ; пер. с англ. Е. Летова, М. Пчелинцева. – М.: АСТ ; СПб.: Terra Fantastica, 2000. – 317 с.

4. Книш І. В. Мережевий філософський дискурс стосовно принципів: rhizoma vs radix vs hyphe / І. В. Книш // Практична філософія. – 2017. – № 1 (63). – С. 53–62.

5. Книш І. В. Філософський дискурс: rhizoma vs radix vs hyphe / І. В. Книш // Філософія і політологія в контексті сучасної культури: науковий журнал. – Дніпро, 2016. – Вип. 6 (15).– С. 157–164.

6. Кононов Д. А. Информационное управление: принципы моделирования и области использования / Д. А. Кононов, В. В. Кульба, А. Н. Шубин // Труды ИПУ РАН. Т. XXIII. – М.: ИПУ РАН, 2004. – С. 5–29.

7. Кочубей Н. В. Синергетические концепты в нелинейных контекстах: сети, управление, образование / Н. В. Кочубей. – Saarbrûcken, Deutschland : Palmarium Academic Publishing, 2013. – 260 с.

8. Лепский В. Е. Рефлексивные аспекты в эволюции представлений об управлении / В. Е. Лепский // Рефлексивные процессы и управление : международный научно-практический междисциплинарный журнал. – № 1/2. – Т. 12. – М.: Изд-во «Когито-Центр», 2012. – С. 26–59.

9. Лефевр В. А. Алгебра совести / В. А. Лефевр ; пер. со 2-го англ. изд. с

доп. – М.: Когито-Центр, 2003. – 426 с.

10. Лефевр В. А. Конфликтующие структуры] / В. А. Лефевр. – М.: Изд-во «Советское радио», 1973.– 158 с.

11. Лефевр В. А. О самоорганизующихся и саморефлексивных системах и их исследовании / В. А. Лефевр // Проблемы исследования систем и структур : материалы к конференции : сборник. – М.: АН СССР, 1965. – С. 61-68.

12. Морен Э. Метод. Природа природы / Э. Морен. – М.: Прогресс-Традиция, 2005. – 464 с.

13. Нейман Дж. фон. Общая и логическая теория автоматов [Электронный ресурс] / Дж. Нейман. – Режим доступа : http://db3.nsc.ru:8080/jspui/bitstream/SBRAS/9093/5/Neuman_Can_Turing.pdf

14. Степин В. С. Саморазвивающиеся системы и постнеклассическая рациональность / В. С. Степин // Вопросы философии. – 2003. – № 8. – С. 5–17.

15. Шестакова И. Г. Ноосфера: материализация идеи как ключевой фактор современного прогресса / И. Г. Шестакова // Исторические, философские, политические и юридические науки, культурология и искусствоведение. Вопросы теории и практики. – Тамбов : Изд-во «Грамота», 2013. – № 3 (29) : в 2 ч. – Ч. I. – С. 202–206.

16. Deleuze, G. A Thousand Plateaus: Capitalism and Schizophrenia (transl. B. Massumi) / G.Deleuze, F. Guattari. – Minneapolis, London: University of Minnesota Press, 1987.

17. Moore G. E. Cramming more components onto integrated circuits [Electronic resource] / Gordon E. Moore // Electronics Magazine. – 1965. – P. 4. – Mode of access : ftp://download.intel.com/museum/Moores_Law/Articles-Press_Releases/Gordon_Moore_1965_Article.pdf

18. Motloch J. L. Big History Understanding of Complexity, Informatics and Cybernetics / John L. Motloch // Systemics, cybernetics and informatics. - VOLUME 15 - № 6, 2017. – P. 54-60.

19. Umpleby S. A. Reviving the American Society for Cybernetics, 1980-1982 [Electronic resource] / Stuart A. Umpleby. – Mode of access : https://www2.gwu.edu/~umpleby/recent_papers/2016/2016%20CHK%20Reviving%20ASC%20in%201980s.pdf. – Загл. с экрана.

20. Wiener N. Cybernetics or Control and Communication in the Animal and the Machine / Norbert Wiener. – Paris : Hermann & Cie Editeurs ; Cambridge, Mass : The Technology Press ; New York : John Wiley & Sons Inc., 1948. – 194 p.

References:

1. Bevzenko, L. D. (2002). Sotsialnaya samoorganizatsiya. Sinergeticheskaya paradigma: vozmozhnosti sotsialnykh interpretatsiy. Kyiv: Instytut sotsiologii *NAN* Ukrainy.

2. Burkov, V. N., & Kondratyev, V. V. (1981). Mehanizmy funktsionirovaniya organizatsionnyh sistem. Moskva: Nauka.

3. Deleuze, G., & Guattari, F. (1987). A Thousand Plateaus: Capitalism and Schizophrenia (transl. B. Massumi). Minneapolis, London: University of Minnesota Press.

4. Gibson, W. (1984). Neuromancer. New York: Ace Books.

5. Knysh, I. V. (2017). Merezhevyi filosofskyi dyskurs stosovno pryntsypiv: rhizoma vs radix vs hyphe. Praktychna filosofiya, 1 (63), 53-62.

6. Knysh, I. V. (2016). Filosofskyi dyskurs: rhizoma vs radix vs hyphe. Filosofiya i politologiya v kontekste sovremennoy kultury. Dnipro, 6 (15), 157-164. https://fip.dp.ua/index.php/FIP/article/view/83

7. Kochubey, N. V. (2013). Sinergeticheskiye kontsepty v nelineynykh kontekstakh: seti, upravleniye, obrazovaniye. Saarbrûcken, Deutschland: Palmarium Academic Publishing.

8. Kononov, D. A., Kulba, V. V., & Shubin, A. N. (2004). Informatsionnoye upravleniye: printsipy modelirovaniya i oblasti ispolzovaniya. In Trudy IPU RAN (pp. 5-29). Moscow: IPU RAN.

9. Lefebvre, V. A. (2003). Algebra sovesti. Moskva: Kogito-Tsentr.

10. Lefebvre, V. A. (1973). Konfliktuyushchiye struktury. Moskva: Sovetskoye Radio. http://314159.ru/lefebvre/lefebvre1.html

11. Lefebvre, V. A. (1965). O samoorganizuyushchikhsya i samorefleksivnykh sistemakh i ikh issledovanii. In Problemy issledovaniya sistem i struktur: materialy k konferentsii, Moskva: AN SSSR (pp. 61-68).

12. Lepsky, V. Ye. (2012). Refleksivnye aspekty v evolutsii predstavleniy ob upravlenii. Refleksivnye protsessy i upravleniye. Moskva: Izd-vo "Kogito-Tsentr", 12 (1/2), 26-59.

13. Moore, G. E. (1965). Cramming More Components onto Integrated Circuits. Electronics Magazine, 38 (8), 4. ftp://download.intel.com/museum/Moores_Law/Articles-Press_Releases/Gordon_Moore_1965_Article.pdf

14. Morin, E. (2005). Metod. Priroda prirody. Moskva: Progress-Traditsiya.

15. Motloch, J. L. (2017). Big History Understanding of Complexity, Informatics and Cybernetics. Systemics, Cybernetics and Informatics, 15 (6), 54-60.

16. Neumann, (von). J. (1960). Obshchaya i logicheskaya teoriya avtomatov. In A. Turing (Ed.) Mozhet li mashina myslit'? Moskva:GIFML. http://db3.nsc.ru:8080/jspui/bitstream/SBRAS/9093/5/Neuman_Can_Turing.pdf

17. Shestakova, I. G. (2013). Noosfera: materializatsiya idei kak klyuchevoy faktor sovremennogo progressa. Istoricheskiye, filosofskiye, politicheskiye i yuridicheskiye nauki, kulturologiya i iskusstvovedeniye. Voprosy teorii i praktiki. Tambov: Izd-vo "Gramota, 3 (29), P. I, 202-206. http://scjournal.ru/articles/issn_1997-292X_2013_3-1_55.pdf

18. Stepin, V. S. (2003). Samorazvivayushchiyesya sistemy i postneklassicheskaya ratsionalnost'. Voprosy filosofii, 8, 5-17.

19. Umpleby, S. A. (2016). Reviving the American Society for Cybernetics, 1980-1982. Cybernetics and Human Knowing, 23 (1), 19-27. http://cepa.info/2837

20. Wiener, N. (1948). Cybernetics: or Control and Communication in the Animal and the Machine. Paris: Hermann & Cie; Cambridge, MA: Technology Press; New York: John Wiley & Sons.

Анотація. *Розглянуто апгрейд кібернетики на сучасному етапі її розвитку. Зазначено, що кібернетика першого порядку вивчала системи, за якими можна спостерігати, другого – мала справу із спостережними системами, а третього – досліджувала процеси, що відбуваються в суб'єкт-полісуб'єктному середовищі – кіберпросторі. Обґрунтовано доречність уживання поняття «гіфпростір» (hyphspace) як метафоричної абстракції на означення віртуальної реальності (складової Ноосфери), яка існує в комп'ютерних мережах (суб'єкт-полісуб'єктному середовищі). Доведено, що гіфпростір на сучасному етапі розвитку кібернетики є основою для її подальшого (проте не остаточного) апгрейду до кібернетики четвертого порядку. Констатовано, що кібернетика як наука рухається від пізнання людино-машинних систем до утворень, де зростає людиновимірність, про що свідчить неухильне збільшення присутності користувачів-номад (суб'єктів пізнання), які постійно спостерігають у мережі за собою й іншими.*

Ключові поняття: *апгрейд, кібернетика, кіберпростір, гіфпростір, суб'єкт-полісуб'єктне середовище, синергетика, управління, номади.*

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