

**МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
СУМСЬКИЙ ДЕРЖАВНИЙ УНІВЕРСИТЕТ
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ТА СОЦІАЛЬНИХ КОМУНІКАЦІЙ**



СОЦІАЛЬНО-ГУМАНІТАРНІ АСПЕКТИ РОЗВИТКУ СУЧАСНОГО СУСПІЛЬСТВА

**МАТЕРІАЛИ ВСЕУКРАЇНСЬКОЇ НАУКОВОЇ КОНФЕРЕНЦІЇ ВИКЛАДАЧІВ,
АСПІРАНТІВ, СПІВРОБІТНИКІВ ТА СТУДЕНТІВ**

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2. Murasova GE Specificity of teachers in the system of distance learning IV International scientific-practical conference "Educational Process: Inside materials IV Intern. Scient. and practical. Conf., Nov. 29-30. 2010: In 2 t. - D., K. Bila, 2010. http://www.confcontact.com/20102911/4_muras.htm
3. Kadyrov EA The implementation of competence-based approach in the preparation of the teacher of high school for LMS. Distance Learning Center Ryazan State Radio Engineering University <http://2013.moodle moot.in.ua/course/view.php?id=75&lang=ru>

SYNERGETIC APPROACH TO THE DESCRIPTION OF REALIZATION OF THE PRODUCT AT THE STAGES OF DESIGN, MANUFACTURING AND OPERATION

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Efficiency of programmable logic controller functioning is in many respects connected with presence of corresponding objective laws of management, which are capable to consider condition and changes of the internal and the external environment. Problems management of such dynamic systems are rather relevant and require new theoretical approaches. A present economic crisis is an acknowledgement of that.

As the research of complex systems shows [1], representation of the self-organizing system is reduced to the self-coordinated description of time dependences of order parametre, the interfaced to its field and the operating parametre. As efficiency of realisation of programmable logic controller is defined at its operation, then it is necessary to accept the production function of maintaining (using) system Q as an order parametre. Accordingly, the conjugated field represents the production function of making system G , and the operating parametre F characterises a gain of scientific and technical results. As a results, the problem is reduced to an expression of the specified quantities' change rates $\dot{Q}, \dot{G}, \dot{F}$ through their values Q, G, F .

Considering that the behaviour of parameter of an order $Q(t)$ is the core and subordinates behaviour of the conjugate field $G(t)$ and the operating parameter $F(t)$, we will accept an expression for its change rate \dot{Q} in the linear form

$$\tau_Q \dot{Q} = -Q + A_Q G. \quad (1)$$

The equation for the conjugated field is accepted as

$$\tau_G \dot{G} = -G + A_G Q F, \quad (2)$$

where the first summand again has a relaxation nature with the characteristic time τ_G , the second one represents a positive feedback of the production function of the using system and a gain of scientific and technical results with the change rate of the conjugated field.

The last equation of evolution of the system describes the relaxation of the gain of the scientific and technical results F , which plays a role of the operating parameter:

$$\tau_F \dot{F} = (F_e - F) - A_F Q G. \quad (3)$$

According to system of synergistic equations (1) - (3) is the elementary field scheme representing effect of self-organising [2]. For the analysis of this system it is convenient to make use of dimensionless variables by scaling time t , the production function of the using system Q , conjugated field G and internal status parameter F

$$\tau_Q, Q_c \equiv (a_G a_F)^{-1/2}, G_c \equiv (a_Q^2 a_G a_F)^{-1/2}, F_c \equiv (a_Q a_G)^{-1}. \quad (4)$$

Then the behaviour of PLC processes is represented by the dimensionless system of the equations

$$\dot{Q} = -Q + G, \quad (5)$$

$$\sigma \dot{G} = -G + Q F, \quad (6)$$

$$\delta \dot{F} = (F_e - F) - Q G, \quad (7)$$

where relations of characteristic times $\sigma \equiv \tau_G / \tau_Q$ and $\delta \equiv \tau_F / \tau_Q$ are entered.

The conducted researches show that Lorentz's system ((5) - (7)) allows to present the basic features of transition from the mode of inefficient realisation of PLC to the mode of its effective realisation in the self-coordinating way. The phenomenological description is reached due to dependence of synergistic potential $V(Q)$ on the production function of the maintaining system.

References

1. A.I.Olemskoi. Complexity of self-similar hierarchically constrained ensembles//JETP Letters. –2007. – V.85, No.2, pp.127-130.
2. A.I. Olemskoi. Axiomatic theory of self-organizing system//Physica A. - 2002. – V.310. - pp.223-233.

INTELLIGENT DECISION SUPPORT SYSTEM FOR RENAL RADIONUCLIDE IMAGING

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Radionuclide imaging of kidneys has a special place in nuclear medicine. It allows to register functional changes, far earlier than the structural and anatomical changes. Therefore, it is indispensable at early diagnosis. The reliability of data interpretation of renal scintigraphy studies depends on the level of doctor-diagnostician's professional qualification and on the presence of their practical experience.

One way to reduce the load on a doctor-diagnostician and to improve the accuracy of a diagnostic conclusion is the realization of intelligent algorithms of classification scintigraphic images. At the same time a set of classes is characterized by three functional kidney states. The first class characterizes the normal state of renal function without any apparent violations. The second class characterizes renal parenchymal disease and the third class characterizes an impaired urinary dynamics.

The most promising direction is the use of information-extreme intellectual technology methods of extreme of analysis and synthesis (IEI-technology) for self-learning diagnostic systems. The information-extreme algorithms are based on adaptive binary coding of feature values and on optimization of geometrical parameters of feature space partitioning into equivalence classes in the process of maximization of the system information ability. In this case, it is used the modified S. Kulback's information criterion for the estimate of diagnostic system efficiency which is expressed in the terms *positive* and *negative predictive*.

Information-extreme machine learning is used for dynamical scintigram segmentation (pixels classification) and renogram curves recognition for building an unerring classifier on a training set.

Therefore, application of IEI-technology ideas and methods in