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THE FEATURES OF PRACTICAL USE OF THE COGNITIVE MODELING TECHNOLOGY FOR THE COMPLEX ANALYSIS

The cognitive modeling technology is used in the various difficult fund. and applied sciences: the natural sciences (theor. mechanics – spec. 01.02.01), the technical sciences (informatics and system analysis – spec. 05.13.01 and 05.13.10), the hum. and social sciences (economics and financial analysis – spec. 08.00.10), the med. sciences (psychophysiology, ergonomics, ophthalmology, molecular biology and physical chemistry – spec. 19.00.02, 19.00.03, 14.01.07, 03.00.03 and 02.00.04).

The solving of complex task of the complex analysis of the difficult objects, processes and phenomena based on the parametrical cognitive models block is provided by means of insignificant modification of the structure of the difficult object, process or phenomenon, and also the development of new components – the parametrical cognitive models block with the models of the 1st and 2nd generation.

The apparatus of the cognitive modeling technology includes the iterative cycle (the sequence of stages of the system analysis from the gravitational to the nuclear level with the possibility of dynamic cloning, verification and subtracking), the technique of its usage for the complex analysis of the difficult objects, processes and phenomena, the algorithms of formation of the difficult cognitive models of the 1st and 2nd generations, the techniques of res. of the parameters of the difficult cognitive models of the 1st and 2nd generations and the algorithms of processing of a posteriori data of the complex analysis of the problem spheres.

The complex of programs for the automation of complex analysis is being developed, which includes the means of automation of the formation, research and analysis based on the cognitive models of the 1st generation and 2nd generation.

The ways of presentation of the cognitive model are related with the problem environments and differentiated on: the formal classical (the logical and production models), the nonformal classical (the semantic and frame networks and ontology), the formal new (the calculus of the theory of sets and corteges on domains and the calculus of the theory of sets and graphs), the nonformal new (the multi-level structural scheme and the multi-level incapsulated pyramids, combining the theory of graph and the theory of sets), the flat ways of representation of the 1st generation (the cognitive disc and the cognitive circle), the volumetric ways of representation of the 1st generation (the cognitive cylinder, the cognitive cone and the cogn. sphere), the volumetric ways of presentation of the 2nd generation (the one-, two-, three-, four- and five-cognitive disc, cognitive circle, cognitive cylinder, cognitive cone and cognitive sphere).

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It is necessary to take into account the coeff. of difficulty of the object, process or phenomenon (a posteriori data) $K = N / N_j$: at $K > 0,9$ – difficult, at $K < 0,2$ – easy; N_j – the actual set of parameters, N – the theoretical set of parameters.

The arrangement and the analysis of the main rocket engine, the first, the second, the third and the fourth rocket engine of launch-vehicle is proposed by means of the general (graphical) way of presentation of the cognitive model in the view of 1-, 2-, 3-, 4-, 5-cogn. disc and cogn. circle (the flat repress., the 2nd generation).

The structure and the analysis of the multidimensional code device is proposed by means of the general (graphical) way of representation of the cognitive model in the view of 1-, 2-, 3-, 4-, 5-cognitive cylinder (the volumetric repres., the 2nd generation): the horizontal rotation is realized directly on 8 positions (the string of symbols – symbol 1, symbol 2, …, symbol j, …, symbol 8), the vertical movement is provided directly on 8 levels (the column of symbols – row of symb. 1, row of symb. 2, ..., row of symb. i, ..., row of symb. 8).

The formal description of the modif. model of reduced eye is proposed by means of the general (graphic.) way of representation of the cognitive model in the view of the 8-cognitive circle (the flat representation, the 2nd generation), in the view of the 8-cognitive sphere (the volumetric representation, the 2nd generation).

The model of reduced eye is considered for the research of the acuity of vision, the field of vision and the color perception in the Descartes space of 2 and 3 coordinates.

The research of the structure of the chem. el. with 1, 2, 3, 4 and 5 nucleuses is proposed by means of the general (graphic.) way of representation of the cognitive model in the view of the one 8-cognitive sphere (the volumetric representation, the 2nd generation), in the view of the two 8-cognitive spheres (the volumetric representation, the 2nd generation), in the view of the three 8-cognitive spheres (the volumetric representation, the 2nd generation), in the view of the four 8-cognitive spheres (the volumetric representation, the 2nd generation), in the view of the five 8-cognitive spheres (the volumetric representation, the 2nd generation).

The formal description of the structure of the difficult multidimensional hurricane by means of the general (graphic.) way of presentation of the cognitive model in the view of the 8-cognitive cone (the volumetric representation, the 2nd generation), and also the hybrid in the view of the four 8-cognitive cones (the volumetric representation, the 2nd generation) and the 8-cognitive circle (the volumetric representation, the 2nd generation).

The structure of the modern technological process of measurement includes:
1) the phenomenon being researched – the difficult object, process and phenomenon of research;
2) the technology of research (the cognitive modeling technology) – the means of measurement (the sensor, the system of sensors, the analog-digital converter);
3) a posteriori data – the subject of research (the observer and the laboratory).

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The techn. process of statistical justification of a posteriori data includes: the calculation of the main measures of central tendency (the primary processing – minimum, maximum, average, mode, median, quantity, asymmetricity, excess, crit. values, quartile, percentile, graphs with covariance and frequencies), the revealing of the features of distribution (the type of distribution, outliers and artifacts), the selection of the methods of statistical analysis (the secondary processing – the correlation analysis and the features of correlation and covariance, the dispersion analysis and the features of deviation from the central tendency, the regression analysis and the features of quant. dependent variable and the analysis of residuals, the discriminant analysis and the feat. of position of the centroids of classes in the space, the multidimensional scaling and the features of nominative dependent variable, the hierarchic cluster and the features of dendrogram and the sequence of combining of classes, the factor analysis and the features of formation of the groups of variables).

The directions of using of the cognitive modeling technology are presented on my information-educational portal www.vetrovan.spb.ru and in my two personal sections in the collective scientific monography of "IHEAS" "The factors of success in the educational activity of modern HEI" (2004 y.), in my personal scientific monography "The features of evolution of the theory of information and information technologies on a threshold of the XXIst century" (2004 y.):
1) the system analysis of the difficult objects, processes and phenomena – allows to realize the system analysis of the difficult object, process and phenomenon, to reveal the tendences, dependencies and regularities, to select regulated the subject areas for the scientific justification of the problem sphere;
2) the system analysis of the information-educational environment – allows to carry out the system analysis of the information-educational environment and to increase the efficiency of funct. of the automated training system, my personal monography "The environment of automated training with the properties of adaptation based on the cognitive models" (2005 y.) is prepared;
3) the financial analysis of the functioning of the (credit) organization – allows to carry out the analysis of the efficiency of functioning of the organizational structure of the credit organization and enterprise based on the data of the primary registers of the fin. reporting-documentation with the results of activity, my personal monography "The cognitive modeling technology for the financial analysis and audit of the organization" (2004 y.) with append. (2007 y. and 2010 y.) is prepared, my three scientific-practical monographies (abbreviated and complete) "The calculation of the analytical coefficients system for the vertical, (horizontal and trend) financial analysis and audit based on the cognitive modeling technology" (RAS and IAS / GAAP) (2007 y. and 2010 y.) is prepared.