

Vetrov Anatoly Nikolaevich

The features of the cognitive modeling technology for the complex analysis

the author of the unique cognitive modeling technology

RF, Saint-Petersburg city, www.vetrovan.spb.ru

The information technologies and the difficult information production of one- and multi-nomenclature information product carry out one-to-one transformation of diverse information of the first kind (the inexhaustible resources – the information, expressed in the signal form from the objects and subjects of (in)animate nature) into the information of the second kind (the information products – the information, expressed in the form of data on the carriers).

The modern technological process of difficult measurements includes the object of research, the means of measurement and the subject of research (observer).

The complex approach to the complex analysis based on the parametrical cognitive models block, which directly suggests: the making of changes into the structure of the res. difficult objects, processes or phenomena

(the additional actions in the organization and technology of research – the modified structure of the organization and technological process of research, the modification of the structure of object, process or phenomenon – the modified principle of functioning in the linear, nonlinear, deterministic or stochastic environment, the modification of the problem environment of functioning – the modified principle of functioning of environment taking into account the features of the subject area), and also the introduction of new components in the problem environment (the parametric cognitive models block – the 1st generation: the cognitive model based on the cognitive disc, cognitive circle, cognitive cylinder, cognitive cone and cognitive sphere; the 2nd generation: the cognitive model based on the difficult 1-, 2-, 3-, 4-, 5-cognitive sphere, 1-, 2-, 3-, 4-, 5-cognitive disc, 1-, 2-, 3-, 4-, 5-cognitive circle, 1-, 2-, 3-, 4-, 5-cognitive cylinder and 1-, 2-, 3-, 4-, 5-cognitive cone).

The cognitive modeling technology is considered, which includes its iterative cycle, the technique of its use for the complex analysis, the (non)formal ways of presentation of the cognitive model of the 1st and 2nd generations (the theory of sets and corteges on domains as the analytical representation, the oriented graph, combining the theory of sets as the graphical representation, the multi-level structural scheme without connections as the graphical representation, the structural pyramidal difficult scheme with the set of encapsulated pyramids), the general (graphical) ways of representation of the structure of the cognitive model (the 1st generation – the flat representation: the cognitive disc and cognitive circle; the volumetric representation: the cognitive cylinder, cognitive cone and cognitive sphere; the 2nd generation – the flat repres.: 1, 2, 3, 4, 5-cognitive disc and 1, 2, 3, 4, 5-cognitive circle; the volumetric repres.: 1, 2, 3, 4, 5 cognitive cylinder, 1, 2, 3, 4, 5-cognitive sphere), the algorithms of formation of the structure of the (difficult) cognitive model of the 1st and 2nd generations, the techniques of research of the parameters of the difficult cognitive model of the 1st and 2nd generations, the algorithms of the primary and secondary processing of a posteriori data of the complex analysis.

The architecture is proposed and the software realization of the complex of programs for the automation of the tasks of research of the difficult objects, processes and phenomena is created.

The iterative cycle of the cognitive modeling technology includes the stages: the identification – the primary presentations about the researched situation (object, process or phenomenon), the changing of the tasks of research and restrictions; the conceptualization – the conceptual scheme of the researched situation (the object, process or phenomenon) in the subject area and the modification of a set of concepts, describing the object (the formation of basis of a sets of diverse parameters); the structuring – the structured knowledge (the strata of layers of different parameters are echeloned on the portraits taking into account the scientific bases of problem environments) about the situation (the object, process or phenomenon) in the subject area and the modification of the conceptual scheme of the object, process or phenomenon in the given locality; the formalization – the building of the 1st and 2nd level of the structure of the cognitive model and the changing of the way of representation of the structure of the parametrical cognitive model; the structural analysis – the verification of the first level of the structure of the cognitive model and the modification of the first level of the structure of the parametrical cognitive model; the parametrical analysis – the verification of the second level of the structure of the cognitive model and the modification of the second level of the structure of the parametrical cognitive model; the realization – the placement of the received model in the basis of the problem environment and the revealing of discrepancies and difficulties at the integration of the model (the dyn. cloning); the modeling – the modeling based on the holistic approach, the problems of measurement and the taking into account of the different parameters in the problem env. or without links with the env.; the analysis – the primary and secondary statistical processing of a posteriori data, which is obtained using the cogn. model of the 1st and 2nd generation, the revealing of diverse of the tendencies, dependencies, regularities and ambiguities (heterogeneities); the subject interpretation – the interpretation of the obtained tendencies, dependencies and regularities (the knowledge about the condition) and the scientific justification of the obtained results about the dynamics of functioning of the object, process or phenomenon in the environment; the synthesis – the new knowledge about the dynamics of dev. of the situation (the object, process or phenomenon) in the subject area and the addition of the new aspects of consideration of the object, process or phenomenon based on the parametrical cognitive models block.

The specified technique of using of the cognitive modeling technology, the algorithm of formation of the structure of the cognitive model of 1st and 2nd generations, the technique of research of the parameters of the cognitive model of 1st and 2nd generations, the algorithm of processing of a posteriori results of research are intended for the complex analysis of the difficult objects, processes or phenomena and their localities.

The formal description of the structure of the cognitive model of the 1st and 2nd generations is allocated, in particular the examples: the multidimensional discrete code device based on the 1, 2, 3, 4, 5-cognitive cylinder as the volumetric representation of the 2nd generation; the rocket engines based on the 1, 2, 3, 4, 5-cogn. disc (circle) as the flat repres. of the 2nd generation; the modified model of reduced eye based on the 1, 2-cognitive sphere for the research of the optical and biological construct of the eye of the organism; the structure of the chemical elements based on the 1, 2, 3, 4, 5-cognitive sphere as the volumetric repres. of the cogn. model of the 2nd generation (theoretical mechanics and nano-technology).

The scientific reports to “RA(N)S” for the awarding me the scientific degree of acad. of “RA(N)S” in spec. 01.02.01, 05.13.01, 05.13.10, 19.00.03, 08.00.10 (www.vetrovan.spb.ru) have been prepared.