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THE APPLIED SCIENTIFIC RESEARCHES DIRECTION
“APPLICATIONS OF MATHEMATICS AND MATHEMATICAL TECHNOLOGIES
IN MEDICINE” (“APMATH AND MATHT IN M”)
OF “SEC "SFA CMT" OF "RA(M)S" N. A. ACAD. BURDENKO N.N.”

The developed “The applied scientific researches direction
“Applications of mathematics and mathematical technologies in medicine” (“APMATH and MATHT in M”)
treats to the applied scientific researches divisions
of “The scientific-educational centre “System and financial analysis based on
cognitive modeling technology” of “RA(M)S” named after acad. Burdenko N.N.”
 (“SEC "SFA CMT" of “RA(M)S” n. a. acad. Burdenko N.N.” – SEC) as the first SEC
in the structure of “SIO “Academy of cognitive natural sciences”” (“SIO “ACNS””)
as the add. component of the system of science and education of the modern country
for the creation, distribution and use of the main and derivative
scientific results of the cognitive modeling technology (CMT) (www.vetrovan.(spb.)ru)
[see the applied scientific researches directions and departments of SEC]:
1) it is executed by the principle of “administrative-economy submission”;
2) works in the several main directions, which allow to provide
the development of the applied main and derivative scientific results
(my second report on SRW from 2006-2008(9) y. was submitted
to “SPbSETU “LETI”” and “The Government of RF”
for the translation, carrying out of int. action and receiving of “The Nobel prize”);
3) includes the several various main divisions:
I. “The applied scientific researches department
“Applications of medical mathematics and the complex system analysis based on
the cognitive modeling technology”” (“APMMATH and DSAB on CMT”) (*)
*[the applied scientific researches in area
“ Applications of medical mathematics ” (*)* –
usage of the theoretical bases of medical mathematics,
usage of general questions of theoretical medical mathematics,
usage of theory of mathematical logic and theoretical bases of mathematics in medicine,
usage of theory of numbers in medicine, usage of theory of medical algebra,
usage of theory of medical topology, usage of theory of medical geometry,
usage of theory of the mathematical analysis in medicine,
usage of theory of the functions of valid variables in medicine,
usage of theory of the functions of complex variables in medicine,
usage of theory of ordinary differential equations in medicine,
usage of theory of differential equations with the private derivatives in medicine,
usage of theory of integrated equations in medicine,
usage of theory of mathematical models of the objects, processes and phenomena
of natural sciences and technical sciences in medicine,
usage of theory of the equations of mathematical physics in medicine,
usage of theory of variation calculus in medicine,
usage of the mathematical theory of optimal control in medicine,
usage of theory of the functional analysis in medicine,
usage of theory of calculus mathematics in medicine,
usage of theory of probability and mathematical statistics in medicine,
usage of theory of the combinatory analysis in medicine,
usage of theory of graphs in medicine, usage of theory of mathematical cybernetics in medicine,
usage of theory of the ways of representation of the cognitive models and problem environments in medicine,
usage of theory of the parametrical cognitive models block in medicine
and usage of the cognitive modeling technology in the applications of medical mathematics;

the applied scientific researches in area “Applications of the complex system analysis in medicine” () – usage of the theoretical bases of the complex system analysis in medicine, usage of general questions of the theoretical complex system analysis in medicine, usage of theory of tendencies, dependences and regularities of the complex system analysis of the objects, processes and phenomena in medicine, usage of theory of the cognitive modeling technology with the dynamic cloning, verification and subverification in medicine, usage of theory of the iterative cycle of the cognitive modeling technology in medicine, usage of theory of the technique of use of the cognitive modeling technology for the complex system analysis of the difficult objects, processes and phenomena in medicine, usage of theory of the parametrical cognitive models block for the complex system analysis and the increase of functioning efficiency of the difficult objects, processes and phenomena in medicine, usage of theory of the structure of the cognitive model of the 0th, 1st, 2nd and 3rd generation in medicine, usage of theory of the ways of representation of the structure of the cognitive models and problem environments in medicine: the formal classical of the 0th generation (the logical and production models), the non-formal classical of the 0th generation (the semantic network, the frame network and ontology), the formal new of the 0th generation (the calculus of theory of sets and corteges on domains and the innovative calculus of theory of sets and graphs), the non-formal new of the 0th generation (the multi-level structural scheme and the multi-level encapsulated pyramids combining theory of graphs and theory of sets), the flat of the 1st generation (the cognitive circle and the cognitive disc), the volumetric of the 1st generation (the cognitive cylinder, the cognitive cone and the cognitive sphere), the flat and volumetric of the 2nd generation (the one-, two-, three-, four-, five- and more cognitive circle, cognitive disc, cognitive cylinder, cognitive cone and cognitive sphere), the hybrid of the 3rd generation (the combinations of the existing cognitive models), usage of theory of algorithms of formation of the structure of the difficult cognitive models of the 0th, 1st, 2nd and 3rd generations in medicine, usage of theory of techniques of research of parameters of the difficult cognitive models of the 0th, 1st, 2nd and 3rd generations in medicine, usage of theory of algorithms of processing of a posteriori data of the complex system analysis of the problem spheres in medicine, usage of theory of software for the automation of the tasks of research in medicine, usage of theory of the statistical substantiation of practical use of the received results in medicine, usage of theory of factors influencing on the efficiency of functioning of the difficult objects, processes and phenomena in medicine, usage of theory of organization and plan of carrying out of the experiment in medicine, usage of theory of research of the parameters of the cognitive models in medicine, usage of theory of preliminary processing of a posteriori results of diagnostics in medicine, usage of theory of choice of the methods of the statistical analysis of the formed data sets in medicine, usage of theory of the analysis of dynamics of the resultativity of training in medicine, usage of theory of the dispersion, regression, discriminant, cluster analysis, multidimensional scaling, factorial analysis and bibliographic lists in medicine, usage of theory of the complex system analysis of the modified model of reduced eye for the research of acuity of vision, field of vision, color-perception in Descartes space of the 2 and 3 coordinates and usage of the cognitive modeling technology in the applications of the complex system analysis in medicine].*

II. "The applied scientific researches department "Applications of medical cybernetics and (cognitive) informatics" " ("APMCYB and (CONG)INF") (*)

[the applied scientific researches in area "Applications of medical cybernetics" – usage of the theoretical bases of medical cybernetics, usage of theory of the automatic control systems in medicine, usage of theory of modeling in medicine, usage of theory of the cybernetic control systems in medicine, usage of theory of information in medicine, theory of artificial intelligence in medicine, usage of the applied theory of discrete (finite) automats and formal languages in medicine, usage of the applied theory of reliability in medicine, usage of theory of the applied system analysis in medicine and usage of the cognitive modeling technology in the applications of medical cybernetics;

the applied scientific researches in area "Applications of medical informatics" – usage of the theoretical bases of medical informatics, usage of theory of medical informatics, usage of theory of the organization of information activity in medicine, usage of theory of the documentary sources of information in medicine, usage of theory of analytic-synthetic processing of the documentary sources of information in medicine, usage of theory of information search in medicine, usage of theory of information service in medicine, usage of theory of the technical means of support of the information processes in medicine and usage of the cognitive modeling technology in the applications of medical informatics;

the applied scientific researches in area "Applications of medical cognitive informatics" () – usage of the theoretical bases of medical cognitive informatics, usage of theory of the layer-step model of perception (psycho-physiology of perception), processing (cognitive psychology) and understanding (applied linguistics) of the content of information fragments in medicine, usage of the theoretical bases of the parametrical cognitive models block for the system analysis of the information-educational environments in medicine (the cognitive models of the subject of training and the means of training), usage of the theoretical bases of the parametric cognitive models block for the financial analysis of the (credit) organizations in medicine (the cognitive models for the vertical, horizontal and trend financial analysis), usage of the theoretical bases of formation of the parametrical cognitive models block in medicine, usage of theory of the structure of the cognitive model of the 0th, 1st, 2nd and 3rd generation in medicine,*

usage of theory of the ways of representation of the structure of the cognitive models and problem environments in medicine: the formal classical of the 0th generation (the logical and production models), the non-formal classical of the 0th generation (the semantic network, the frame network and ontology), the formal new of the 0th generation (the calculus of theory of sets and corteges on domains and the innovative calculus of theory of sets and graphs), the non-formal new of the 0th generation (the multi-level structural scheme and the multi-level encapsulated pyramids combining theory of graphs and theory of sets), the flat of the 1st generation (the cognitive circle and the cognitive disc), the volumetric of the 1st generation (the cognitive cylinder, the cognitive cone and the cognitive sphere), the flat and volumetric of the 2nd generation (the one-, two-, three-, four-, five- and more cognitive circle, cognitive disc, cognitive cylinder, cognitive cone and cognitive sphere), the hybrid of the 3rd generation (the combinations of the existing cognitive models), usage of theory of the algorithms of formation of the structure of the difficult cognitive models of the 0th, 1st, 2nd and 3rd generations in medicine, usage of theory of the techniques of research of the parameters of the difficult cognitive models of the 0th, 1st, 2nd and 3rd generations in medicine, usage of theory of the adaptive automation means of the information-educational environment in medicine (the basic and applied diagnostic module, the electronic textbook, the laboratory practical work, the electronic dean's office, the electronic library and others), usage of theory of the technical means of support of the adaptive information interaction in medicine (the adaptive representation of sequence of information fragments processor, the question-answers structures sequence processing processor, the linguistic processor and others), usage of theory of the technical means of support of the financial analysis in medicine (the automation means of formation of the working plan of accounts based on the normative-regulated plan of accounts of the accounting, the automation means of formation of the accounting balance and the report about profits and losses of organization, the automation means of the vertical financial analysis of the organization, the automation means of the horizontal financial analysis of the organization, the automation means of the trend financial analysis of the organization, based on the analytical coefficients system), usage of theory of the technical means of support of the complex analysis in medicine (the automation means of formation and research of the cognitive circle, the automation means of formation and research of the cognitive disc, the automation means of formation and research of the cognitive cylinder, the automation means of formation and research of the cognitive cone, the automation means of formation and research of the cognitive sphere, the automation means of formation and research of the one-, two-, three-, four-, five- and more cognitive sphere and others) usage of the cognitive modeling technology in the applications of medical cognitive informatics].

The applied scientific researches directions and departments of SEC allow to develop the main and derivative scientific results of CMT.