

INTRODUCTION

Studies „from the frontiers of sciences“ possess large attractive force in spite of the high degree of risk for those, who go along this way. There is always a danger of becoming an object of critical „shelling“ from the professional’s broadside in each of the adjacent unitary regions.

Roger Penrose, the chairman of the Department of Mathematics of Oxford University mentions about these dangers in his remarkable book, dedicated to the consideration of the fundamental possibility of designing of an artificial intelligence [135].

The result of border research can be both the amazing new ideas and theories, and useless rehash of already well known.

High risk of interdisciplinary research not only stops, but, as can be seen even encourages outstanding scientists and draws them into the border area. The „victims“ of this passion, in a good sense, have become many well-known mathematicians, mechanics, physics: N. Moiseev, S. Kapica, I. Prigogine, J. Neumann, H. Haken, Malinetskii, Y. Klimontovich and many others.

To work on the junction of different sciences is productive and interesting. It is only necessary to feel as a student in each of the border fields and to understand that you are in the vicinity of scientific bifurcation.

Representatives of „exact science“, including mathematicians are drawn into this place of formalized region as by a magnet force, region which is still „untouched by the mathematician's foot“.

Benefit from the advent of mathematicians is mutual. Into the nonformalized sciences the mathematician introduces not only and not so much the possibility to calculate anything, as mathematical order in the reflections, the formulations, the terminology - as a whole - increases discipline of scientific search in such regions as philosophy, psychology, sociology, history and, even, culture. From the other side these latter mentioned regions give to the dry, removed from context mathematical formulas „sensual“ painting, and sometimes generate new mathematical theories. Specifically, for example, the fuzzy mathematics appeared as a result of this synthesis. One can say that mathematics gives „corporality“ to the nonformalized sciences and, in turn, obtains „spirituality“ from them.

The reasoning’s given above to a certain degree justify the author, whose basic specialties are - mechanics and mathematics, in the attempt to engage into studies in the synthetic region, which is here designated by term „Subjective analysis“.

The starting point of these studies was the work, connected with the optimization of training process, which the author carried out in the 70’s together with his colleague professor V.A. Ignatov. Then the so-called problematic- resource approach, which proved to be sufficiently universal [1, 2, 3], was proposed.

Subsequently for the author it was possible to enlarge the conceptual framework. It became obvious, that from a formal point of view this approach can be interpreted in the terms of the theory of binary relations, although in the meaningful sense it preserves a number of original positions. This relates, in particular, to understanding of categories „problem“ and „purpose“ and interrelation between them.

The author’s first book on this theme was published in 2003 with the title „The elements of subjective analysis“. This work reflects the tendency to develop synthetic concept and the schematic of analysis of active systems, which is rested on the problematic - resource method, the theory of binary relations, the theory of usefulness, the theory of categories, some ideas and the positions of synergetics, information theory. At first it seemed that author will succeed in constructing ordered noncontradictory theory; however, it was sufficiently rapidly explained that in the selected direction this cannot be carried out.

Therefore the book contains in a certain sense, the intermediate results, so to speak, „sprinkled“ with the collection of attempts and alternative models, connected together with the small number of cardinal ideas: „built-in“ optimality of the functioning of psyche with the solution of the problem of selection, the strictly

individual nature of any problems and the required presence there of individual „carrier“, a vital difference in the active systems from the passive, the use of subjective entropy and subjective information as the fundamental measures, which define state and dynamics of active systems, view on the usefulness as to the objective characteristic of situation and on the preferences as to its subjective characteristic.

To me the insufficient strictness and theoretical validity of some conclusions is obvious; reproach in the superfluous theorization, the absence of the experimental confirmation of a number of assumptions and ideas would be justified. Generally, in view of the absence in many instances of experimental material is selected such way, when the specific a priori principles, for example the principle of subjective optimality at first are formulated, conclusions and consequences of them and then are analyzed. And, if they correspond to general empirical ideas, then to say „to the common sense“, then they are recognized as those having the right to exist and subsequently serve as basis for planning and organizing the experimental studies: what to measure? for what purpose? what are measurement requirements? how to plan an experiment? what are the endogenous and exogenous parameters? As a whole, it is possible to say that the presence of a priori models „spiritualizes“ experiment, it makes it possible to leave from the of the so-called „black box“ schematic - task is reduced to the parametric, or structural identification of the models, whose class is determined a priori by the principles adopted. In the present work such a priori principle is the „principle of subjective optimality“, in formulation of which the „subjective entropy“ plays the basic role.

I will foresee criticism from the side of those, who consider that the it is exclusive empirical experience, is the source of theories. Closer to the truth is the assertion, that the „practice“ (experiment) is the criterion of theory truthfulness, when the theory is born first, and experiment follows the theory and is formed with theory. This point of view pleases me more. Let us give on this occasion quote from the book of J. Neumann [124]: „Usually there are many ways to construct a mathematical model, so the question arises as to which of them select. In some cases, the adequacy of the specific model can be validated empirically. In other cases, verification of such kind can be very difficult, and we must rely on our intuitive sense suggests to us that the mechanism postulated in the model satisfactorily corresponds to the phenomenon under study“.

The issue under consideration of priority and primacy: the „theory or experiment?“ is akin to the philosophical problem of what is primary *word* or *thought*. This issue is discussed in the already mentioned paper by Roger Penrose and resolved in favor of the primacy of *thought*.

Actually, it is possible to give many examples, when thought is clearly primary, and word serves only as the formulation of thought, moreover as the nonsingular method. What is born in the head of architect or the artist, the artistic means of future creation, or his verbal portrait? What is born in the head of composer, the melody or its verbal interpretation (can it be the score record?) In these examples the thought is primary, but word comes out as the „notary evidence“ of thought, not always perfected and comprehensive. The theoretical concept and experimental facts can be located in the same relation. There is, of course, and an inverse relationship, when a set of experimental data gives life to the model, which simulates them in the same or a different physical space.

In the first case (the theory superiority) any experiment in view of the fundamental limitations cannot with certainty confirm the theory, but it can disprove it, and, conversely, in the second case, the theory explaining the experiment, must „go beyond the experiment“, otherwise it is meaningless.

An important question about the adequacy of the models is related to Gödel's theorem, which requires an external add-on. According to this theorem, „the Hamilton program“ to create a consistent and closed mathematical axiomatic is not feasible. More of this, locked and non-contradictory theoretical concept cannot be, according to this meaning, developed in this work. It seems to me that a selected theme has not been profoundly analyzed yet and, by this way, it's possible to expect astonishing ideas and results, applications in different subject areas. It does not confuse also that it's something what that is written in the book is already made by others, moreover, for sure so it is. But I'm convinced that, even though there is a well known results described earlier , in the book, there are a lot of new aspects that are to be

analyzed and examined. That's why this publication is justified - to widen the knowledge on concerned matter.

It is also clear, that the planned building still is found in the construction stage and the „scaffolding is not taken yet“.

They over shade facade and they make the architectural concept not completely determined.

Introduction - this is such chapter, which let us allow wider view on the problem, constituting basic contents of the book, the consideration of adjacent concepts and ideas in the freer form, in order to create the background, on which, the further basic action is developed.

In this sense let us examine a number of general ideas and views, including the author's position, and from the other side, closely related to the fundamental assumptions.

One of such questions is a question about the possibility of designing of artificial intelligence, which is discussed, in particular, in the book of Roger Penrose [135], and where the answer proves to be negative. Here also essential role plays Gödel's theorem.

It's possible to create a computer able to think, feel, act, create, but all that within margins of a model of „behaviorism“, developed by psychologists, that treats a human as cybernetic system, which is determined by environment conditions - a concept of „homo economics“ in contrast to „homo sapiens“. This computer will probably pass any of Turing test, but it will not become „silicon person“. Roger Penrose sees a fundamental impossibility of creating an adequate artificial mind with ability of spontaneous manifestations of creation, including scientific, fantasy. Basis of these attributes lie deep on the quantum level. Completely fantastic and improbable captivating appears to be an idea of large-scale quantum coherence, expressed by Penrose. Human's brain can be a quantum laser system.

One of the used basic categories - a „problem“ is understood as a „desire“ on a background of alternative possibilities of its satisfaction, therefore, a concept of the „problem“ is to the same degree universal as universal the „desire“ is. There is a point of view, that the moment of „desire appearance“ is the same moment of „life appearance“. The thesis about the fact that „life arose there and then, where and when arose desire“ is being discussed. A comparison of „living“ with „desire“ is imagined to be regular, but immediately a question arises about superiority: which is primary the „life“ or the „desire“. The answer to this question proposes synergetic - a branch of science that emerged in the second half of past century, and which studies processes of self-organizing in animate and inanimate nature from the new positions. Recently a series of books of synergetic founders in Russian language have been published: H. Haken, I. Prigogine, G. Nikolis, their followers W. Ebeling, A. Engel, R. Faystel [8, 9, 14, 55, 132, 133, 151, 153], and also of Russian and Ukrainian authors S. Kapitsa, S. Kurdyumov, G. Malinetskiy, D. Trubetskov, R. Barantsev, A. Loskutov, I. Adrianov, L. Manevich, A. Nazaretyan, L. Melnik, O. Chaly and other [84, 101, 123, 126, 127, 147, 158].

An overall meaning of an answer lies in the fact that self-organizing, which leads to forms of living matter and is, after all, a consequence of the fundamental openness and dissipativity of natural systems as the reaction of matter to the presence of physical heterogeneities and gradients. A prototype of the „desire“ is an orientation of dipole when the gradient of electric potential is present, and the „retraction“ of it is the confluence of force lines.

Let's look, at biblical allegories. God created Adam. He was deprived of emotions and desires, he was indifferent to surrounding. Eve's creation of („heterogeneity“) gave birth to the desire - the „desire of knowledge“ - a first scientific research interest. Adam and Eva were a first scientific research workers, an entire remaining universe - a scientific laboratory of that created and financed by God, and the first scientific theme was called as follows: „To determine that there is good and that there is evil“.

In any case, man appears as a tool of knowledge, also, in this, apparently consists the main, original sense of his existence. His intelligence arose and developed as a result of presence of information traffic. Creating man God wanted to solve the problem, which Gödel realized and represented theorems in the

form: the problem of an external addition. He divided world as an object of knowledge and a subject of knowledge - human- researcher.

After a certain time the man destroyed the limitations established for him: he began to think about the fact what he is itself and, moreover, what the God is. Thus the problem of external addition was deepened and aggravated.

We are the part of the universe and we are intelligent creatures, therefore, *the universe is the living being*, which possesses the reason, most likely, not only ours. From the aforesaid it follows, that the possible main sense of human existence consists of the knowledge of the surrounding world and itself.

This anthropomorphous concept is an impressing one. From it follows, that the „masters of life“ are not God's „goals“ on Earth, but only the „tools“.

The „aims“ of God are those „super flashes of the Nova stars“ that once in a century illuminate the world with new knowledge: Copernicus, Newton, Einstein, Michelangelo, Raphael, Beethoven, Chopin,... These selected by God (read by Nature) are called to the Sinai mountain in order to tell them the revelations, which they communicate to people as the biblical prophets. Not Gödel devised the „fundamental Gödel's theorem“, but God. Gödel only reported it to the rest of the people, like the Prophet. By this theorem, „the mathematics“ proved to be the same open, dissipative system like any other and, specifically, because of its openness, capable of development.

What does indicate the term „subjective analysis“, mentioned in the text and carried out into the title of the book?

This term is connected with the „active system“ concept, i.e. such system, the nucleus, the core of which is the main element –human – *subject* („person, who makes decisions“). Relying on the irreducibility of the human consciousness, the psyche to any „computer simulation model“, to the impossibility of creation absolutely adequate artificial intelligence over any time perspective, taken as the initial postulate, we conduct the fundamental boundary between „active“ and „passive“ systems.

Active systems are in this work the object of attention.

„Subjective analysis“ - it is the analysis of the active systems functioning. It is only „subjective“ in that sense, that all solutions are taken as active system subjects and therefore they are „subjective“.

Existence of active systems, existence and subjects activity - is the objective fact.

It is again necessary to return to the explanation of the sense principle mentioned above.

The „artificial intelligence“ will be most likely created, which in different relations will be considerably more perfect and more effective than human intelligence. Even now, as the „calculator“ the computer is many orders of magnitude more perfect than man. Computer's gigantic memory, speed of information transmission, storage medias, branched systems of solution support is already unattainable for the human. Nevertheless, as yet the computer is similar to primitive rock axe, it is merely „the extension“ of human intelligence. Principally can be created the computer, which will „live“ its own life, may leave out of human's control, it will be self-reproducing and self-improving, but it will not be human. First of all because human is endowed with the capacity for spontaneous creativity (not random, but spontaneous) and also because it seems, one never will succeed to give the computer the ability to „believe“. Computer's intellect always and exclusively will be based only on the knowledge, while human intelligence is based on the organic combination of knowledge and faith. Quite obvious is, that the knowledge does not exist without the faith, just as faith does not exist without the knowledge. Specifically, this organic combination ensures the continuous process of learning – this is, so to speak, technological principle. Between the domain of knowledge and the domain of unknown lies „the boundary layer“ of faith. This faith not only in God, but the faith, understood more broadly, belief, that permeates permanently all the pores of human existence, along with knowledge. The faith and the knowledge are mixed and are the nourishing concentrate for the brain.

Thus, the most rigorous mathematical theories are basically a system of axioms that is an inevitable element of *faith*. All further: lemmas, theorems, equations... represent *knowledge*, but as we see the basis, at the foundation, lies the faith.

What we have said gives grounds to conduct fundamental division between artificial and natural intelligence; between the active and passive systems. What basic assumptions, principles do determine the content of this book? Most common of these has already been mentioned above and they were provided with the appropriate commentaries. Let us pause in for more detail at the working postulates.

The main and most important is the principle of subjective optimality. In its formulation the main role is given to subjective entropy. Therefore, we can speak of a „variational entropy principle“, which allows one to receive and examine different models of preference functions. In this part this work is tightly connected with the works of Jensen [204, 205], and also Haken [151, 152], Neumann and Morgenstern [125], Stratonovich [137]. Variational principle is the unique boundary, which separates, and at the same time establishes connection between the endogenous processes, i.e. the psyche deep processes, and exogenous processes in the „external environment“, which in one way or another are affecting subject's interests. However, the internal work of psyche is manifested for the external „observer“ as the system of preferences formed by the subject on the set of alternatives. Basic assumption is that into subject's psyche the specific principle of the forming the distribution of preferences is „inscribed“, build-in, and that this principle appears variational, that makes each time this distribution optimum in the sense of certain functional. Then the next task is to specify, which this functional is. Here, the author relied on the already mentioned works, as well as on one of the basic assumptions of the categories theory.

We know that each next generation of scientists „stands on the giants arms“. We have reason to trust their insights, which have accumulated previous experience. For me the starting point was the idea of Leonhard Euler that „nothing at all takes place in the universe in which some rule of the maximum or minimum does not appear“. This assertion sounds like a biblical truth and, in this case, it is an element of faith, extended on the psychical processes.

Carl Siegel writes: “according to Leibnitz our world is the best of all possible worlds, and therefore the laws, which control them, can be described by extreme principles“. We know, that in mechanics and physics, leastwise, in the case of conservative systems the dynamics is described by the equations, following from the variational principles, such as the Hamilton's least-action principle. The author of this work was able to show that for certain classes of dissipative systems the variational principles exist [66, 68].

This is, however, insufficient in order to „impose“ the extreme principles of human psyche functioning. Even reference to the theory of categories does not resolve this issue to the end.

We do not have the necessary statistical data, and the distributions of preferences are „poorly observable“ objects. The results of direct observation and measurement of preferences by testing, interviews, submitted questionnaires are unreliable and insufficient to confirm the assumption about „embedded“ optimality of the psyche.

There is, however, another circumstance, which is testifying in favor of the assumption made. In some works (eg, [133, 134]), subjective entropy is closely associated with the internal freedom. In a number of the philosophical systems, including theological, it is considered that human is endowed with the „freedom of will“, that is the „freedom of choice“ (and, consequently, – with responsibility for the selection made). Then, if the principle of the maximum of *subjective entropy* is taken, which acts independently of the external circumstances, thus we are forced to postulate the organic property of psyche to function so that the „internal freedom“ is at maximum each time. Below, in the present work it is asserted, that „freedom“ is a dynamic category and, consequently, extreme principle requires aspiration of the isolated active system toward maximum „internal freedom“.

The presence of „will freedom” requires a method and algorithm of its implementation and the algorithm may not be optimal. This reasoning - heuristic argument for the thesis of the subjective optimality principle, „integrated” into the psyche.

If there is no algorithm for the implementation of „freedom of will”, then the latter is transformed into the „anarchy of will”.

The second essential element of the theoretical foundations is type I and type II preferences: *object preferences* and *rating preferences*. The cardinal model, which historically has been a precursor to the ordinal model, is accepted.

The author suggests that in depths of psyche the preferences are formed as cardinal, but their external fixation (for example, in parliamentary elections) is ordinal in nature. There may exist a similar relationship between „internal” radical and „external” ordinal preferences as that, which exists between the „*thought*” and „*word*” (in the Penrose’s sense).

For each distribution of preferences the *subjective entropy* is introduced as a measure of uncertainty and *subjective information* as a measure of entropy variability. In the formulation of the variational principle significant is that to each is assigned its individual, „personal” functional. Common here is their additive structure for all subjects – the „carriers” and presence of the „subjective entropy” in each of them as the main term.

It may seem, that in connection with the fact, that to each distribution of utilities (resources) the variational principle associates well-defined distribution of preferences, no „freedom of will” exists there. This is not so. The subject chooses the set of alternatives, the „endogenous” parameters of the distributions are at his „disposal”, finally, the so-called entropy thresholds and selection itself, which not compulsorily corresponds to maximum preference, but considers „ethical component”, they remain in subject „conduct” and are outside the competence of the „variational principle”.

The third element of foundation is the *problem-resource approach*, which has already been discussed above. In connection with this approach, the resolution of each problem is represented as a transformation or transfer of resources, a certain, sufficiently general classification of resources is proposed. The most significant from an ideological point of view, in this classification is the separation of active and passive resources.

One of the circumstances that prompted the authors to study issues presented in this book, was the lack of active systems safety and aeronautical safety in particular. Aviation transport system, its structural components, flying vehicle together with its crew, are examples of the active systems, where the „human factor” role is manifested especially vividly. It is known that about 70% of all aircraft accidents are due to the „human factor” action and, in particular, incorrect, or made at the wrong time decisions.

In this sense the description of the pilot role in the form of the „pilot-operator” models, as it is done in the majority of works, for example, in the publication [206], proves to be insufficient. In such studies the component of mental activity in the decision making multi-alternative situation, the conflict situations between the participants, the presence of entropy thresholds and other important circumstances are ignored.

From the standpoint of flight safety issues (Chapter 6) the content of Chapters 1-5 can be regarded as the preparation of the theoretical foundation. In this case, the possibility of effective application of theory developed here in a number of other areas: in the theory of economics, the theory of conflicts, the social dynamics and others becomes apparent.

The work comprises seven chapters.

Chapters 1-4 contain the materials, which form the concept of the „subjective analysis“.

Chapter 1 addresses basic condition of the problem-resource approach, a brief excursus into the theory of binary relations is given.

Chapter 2 deals with the type I individual preferences of different types (the „subject preference“), provides information on utility theory and the elements of category theory, introduces the entropy of the type I subjective preferences and the subjective information, a variant of the algebra of alternatives. A definition is proposed for the entropy of ordinal distributions of preferences.

Chapter 3 deals with the formation of the basic variational principle - the „principle of subjective optimality“ for the type I preferences. For different forms of efficiency function the distributions of preferences, which are conditionally named „canonical“ are obtained.

In chapter 4 the groups of the interacting and interdependent subjects and the new type of preferences - rating preferences are examined. The assumption is done, that they are also formed as the optimal on the basis of variational principle. Information from the theory of collective utility and collective selection is given. The concept of the mutual utility, through which integral and differential ratings are expressed is introduced. Along with the ratings the ranks as „organizational alternatives“ are considered and the concept of „organizational challenge“ is formed. The attempt is made to consider influence on the distribution of the type I ethics preferences - ethical imperatives, the defined formalized schematic of the classification of ethical systems from the point of view of relationship with alternatives sets is proposed, and also the range of the preferences distribution models, in which both utilitarian and ethical component is reflected. Author attempted to take into account the impact on the distribution of I type ethics preferences - the ethical imperatives that offered some formalized scheme of ethical systems classification in terms of relations with the sets of alternatives, as well as several models of the distribution of preferences, which is reflected as a component of the utilitarian and ethical. In connection with this in the chapter material the brief survey of the ethics systems is included. Chapter concludes with a section that reflects an attempt to develop a model of „virtual subject“ (or „collective intelligence“).

Chapter 5 is entirely devoted to studying the dynamics of preferences. The concepts of exogenous and endogenous dynamics and the matching systems of differential equations are introduced. As the possible application of subjective analysis its application to the economic dynamics is examined. The Walras-Leontief system of equations is supplemented with the equations, which describe the dynamics of preferences, which in turn depend on economic factors. As a means of the simulation of some mental processes associated with economic dynamics, the attractors usage is encouraged (Lorenz's attractor, Brusselator). The presented quantitative calculations results show, that the inclusion of the preferences dynamics significantly affects the nature of changes in economic parameters. The possibility of determining the value of subjective entropy together with the assumption about existence of the entropy thresholds of decision making, makes it possible to modify the models of economic dynamics and to investigate directly the influence of psychological factors on the economy. Definite place in the chapter allocated elasticity and stiffness analysis of subjective preferences, which the author provisionally called the elasticity and stiffness of the psyche, and that may be useful in developing methods for selection of pilots, flight crew, teaching methods, sociodynamics problems.

Chapter 6 deals with the problem of active systems safety. It is formulated as independent promising trend. The role of the „human factor“ is understood differently here, in comparison with those studies on the systems safety, which include human, where it's role is regarded as the operator. As in all other cases in the present work, the problem of safety of active systems is formulated and is solved as the task of subjective analysis. Proposed is the theoretical diagram, in which is realized the synthesis of probabilistic description with the components of subjective analysis, in particular, the modified Feller equations, in which figure the distributions of preferences together with the probabilistic distributions. Examples from the

region of aviation safety are examined. Outlined is the approach taking into consideration of the effect of a priori stable imperatives, or rules, defined by normative documents, for the distribution of preferences and, mediately, on the period of decision making.

Finally, Chapter 7 is dedicated to the application of subjective analysis to the theory of conflicts. Within the framework of this approach it proves to be possible to give a certain classification of types of conflicts in the active systems. In this case the conflict of any type is considered as the conflict of the distributions of preferences. Within the framework of entropy approach the so-called „entropy maps“ are examined, which reflect the topology of the „reign of freedom“ and the „reigns of need“. Situation dynamics provides for the passages of active system from one „reign“ into another.

A brief survey is included in chapter, in the historical sequence, philosophical treatments and the definitions, connected with the freedom category. As in the other cases author assumes, that the view on the theory of conflicts from the subjective analysis point of view, represented in this chapter, it will be useful with the analysis of flight safety issues, in the theory of instruction, in social dynamics.

In order to exclude misunderstandings about this work, it is necessary to determine, for what it does not pretend to be. First of all, the author would want to say with the complete certainty: this work is not a psychology study. It does not investigate the mental phenomena as such in the traditional sense. Similarly, the author does not seek to improve the philosophical bases of ethics, the theory of conflicts, and the theory of economic dynamics. In each case discussion deals with the interpretation of various phenomena and processes in the terms of „subjective analysis“, which is intended to give researcher in each of the named regions the quantitative analysis tool in the form of the models of canonical distributions of preferences.

Thus, in each case the specific mathematical formalism is proposed, more or less consonant with the matter essence. Certainly, it is possible that some ideas, expressed in the work, can prove to be useful in these subject areas in the meaningful sense. This is, however, a matter of the future.

Must be said about what author would like to make, but that for various reasons could not do. Among the reasons are the work time frame and the book size physical limitations.

First of all, the work is deliberately not presenting the statistical methods for analyzing the subjective preferences - completely natural and effective method for identifying the canonical distribution of preferences, containing necessary for this parametric, and in some cases, structural arbitrariness. A study in this area can be extremely productive and timely extension in the theoretical and applied senses.

The author excluded the probabilistic interpretation of preferences, and also suggests the use of fuzzy mathematics, where the „point“ representation of preferences could be replaced by fuzzy sets [91].

These natural continuations would be undesirable complication in the stage of primary molding of concept and, they would most likely, add few fundamental moments.

To a question about sense in which this work is related with synergetics, one can answer that this work is not about synergetics as the self-organizing science, but adjoins it closely. An entire series of the excellent last time publications about synergetics of strictly scientific and popular type (mentioned above) served for the author as powerful irritant and stimulus.

One can say that with this book the author prepared soil for strictly synergetic studies of self-organizing active systems, especially in the group of subjects - the effects of clustering, cumulative effects, effects of coherent behavior and other important from the synergetics point of view phenomena, within the framework of subjective analysis ideas, naturally. As a whole, the continuation of the dynamics of preferences research for the different models of canonical distributions is imperative... Especially promising is a study in relation to the groups of subjects.

Very small number of papers reflected the problem of hierarchical systems subjective analysis [95, 110, 111, and 112].

One of the very promising regions of the subjective analysis application is didactics, processes of education and training of all levels and types. Here asserts itself the obvious gradation of tasks and analogies:

- a change in distributing the preferences by the transmission of utilitarian training information - influence on the structure of information resources, the creation of the knowledge reserve;*
- a change in the base properties of intellect, endogenous characteristics - memory, the speed of the information perception, ability to make analytical actions;*
- a change in the ethical ideas, training, personality molding.*

Application of the education problems to the subjective analysis devoted one chapter in my first book on the subjective analysis [64]. Apropos of this book, I must say that it was necessary for me to refuse from something later, but much more, including that, what was not entered into this work, has important significance.

In particular, the problem of the relation between the „shadow“ and „light“ economies, which have been formulated in terms of subjective analysis, and then the numerical results were obtained and proved to be very close to reality.

It should be noted that Chapter 4 shows how relying on entropy optimization principle it is possible to theoretically obtain dependences of supply and demand on prices very close to dependences well known in the macroeconomics, what can be considered as one of the evidences in favor of the realism of the above principle.

One additional question, which is necessary to answer in the introduction: „for whom this book is written and how one should use it?“

I must immediately confess that, first of all, I wrote this book for myself because I was simply interested in doing this. Wide, anything and anybody unlimited space of ideas, approaches, fantasies and inventions. Sensation of complete freedom after the decades of work on the „economic agreements“, difficult interrelations with the customers, with the ministerial officials, with university research sector and research parts, with tens of visas on the reports, „knockout“ of states and financing.

I acknowledge that, working at the book, I completely did not think about its „practical value“, but when the work in essence was made, it became obvious, that it has much greater practical value, than many of my previous works.

Certainly, the work is intended not only for the author himself. At the university where I work, there is a so-called a „New-technology Institute“, in which the „piecework“ is organized, preparing future scientists according to the individual programs. I assume that the book will be useful for the students of this institute and for graduate students.

Therefore it is simultaneously both the scientific monograph and the teaching aid.

I think that it will find readers among those interested in the synergy and, in general research in frontier areas of science, in one way or another connected with the need to consider the human role and the subjective factors.

The question of how many readers the book will have is absolutely not clear.

At the same Penrose book [135] I read this statement: „Every formula reduces the number of readers by half“. If this is true, then will be no readers of my book. It contains too many formulas.

It is mostly difficult to create concept, the more easy is to construct theory on the base of concept and still more easily (certainly, in the ideological sense) to write pile of equations and formulas.

Since, as I think, there is a certain similarity of concept and theory and many formulas in this book, it is possible to suggest to the reader not immediately attempt to dive deeply into the dense forest of mathematical formulas and to go to the breach. The effect can be surprising: order emerging from the woods in torn clothes, bruises and abrasions, such a reader may discover to his disappointment that in the „forest“ there is nothing original, exciting for him, - only the „alder or aspen tree“.

Therefore as the advice, it is possible to propose to the reader to move at first along the openings, going around brushwood formulas and to try to grasp the sense of the developed approach and, then, in proportion to the appearance of an interest, refer to the formulas.

Completing introduction I would want to say that the directions of further studies are more or less obvious, just as essential theoretical difficulties and, in a number of cases, the imperfection of the materials presented in the book. Is also obvious, that the theme is not exhausted and not completed, and in proportion to the advance forward, on the spot of each solved task, the two new tasks appear.