and the sum of two any next members of some more, than aH subsequent, the top limit for $N = \infty$ it is necessary to estimate as 2,596+0,034<2,630. As we see, dimension Sp can be considered not only as integer, but also as irrational (analogy with fractal objects).

As at stratification Sp there is a repayment half s waves of subject and objective parts, it is allowable to treat their dimensions as such which have different signs.

Other self-organization scripts demonstrate more complicated and heterogeneous dependences, where interactions of elements play the greatest roles.

Transition to graphic object models

Decisions and applications do not need anything, but only some characteristics of wave model. It is more convenient to represent this characteristics in graphical form. Therefore it is expedient to esteem the regularity of self-organizing as a set of invariants, and, approximately expressing specific S-transformations by sequences of topological and projective mappings to pass from wave model to homomorphic graphic object models by the way S-graphs and PC-charts. The theory of invariants is constructed; the mappings and models are accordingly categorized [4]. The design concepts and conditions of applicability of mappings are determined. The ways of conditional values binding to physical units of measurements and their graphic expression - metrization of the graphs and charts are designed.

The construction sequence of graphs and charts is such:

- determination of £*f* dimension;
- abstraction from wave model with the view of to imagine her in S-graph appearance into £*2,* so, that were well-kept invariants;
- topological transformations curves into pieces straight with the matter of simplification of graphic image;
- using of local involute for simplification of projection;
- image construction;
- metrization;
- ***addition graphic mode]*** by comments.

Human - environment model

Analysis of factual data gives rise to deduction, that the most general organization case takes place - Sp forms as the result of {Sb} and {Ob} interactions [5].

The simplest way of S-space self-organization models by graph is shown on fig. 1, which reflects general system construction principles (some details not shown). Determine:

- organization levels, sequence and priorities of their beginnings and their correspondence with psychic, physical, physiological and anatomic structures;
- weighing coefficients for each level (proportional to potentials);
- number of elements of each level and amount of independent descriptions (derivative Fibonacci numbers);
- description changes scopes not conducing to violation system organization (from non-admission condition further stratification - convolution);
- exchange mechanisms between elements and levels (from symmetry conditions and keeping laws).

On fig. 1 shown, what exchanges (marked by pointers) it happens because of the damage of the element, marked by circle.

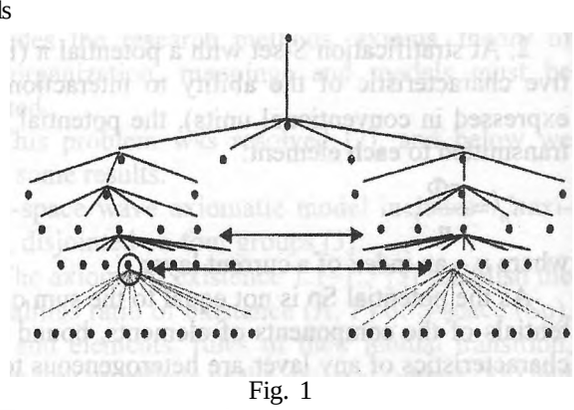

Fig. 1

The phenomena of compensation, regeneration, homeostasis preservation are described in thin lines. The examples of using the HEM are given below.

Perception model

The connection to HEM levels and rhythms of cerebrum is directed into the table on the next page [6]. Estimation of relative weight of different perception appearances *p* , which are take into account are determined:

- action domain for potentials sum of involved levels;
- perception appearance meaningfulness for professional activity *kp*
- perception conditions *k2;*
- correspondence with recognition and making decision:

$$F \sim \frac{\cdot \cdot \cdot}{h \sim ln+1}$$

The practical recommendations, for example, as for guaranteeing of information reverberation systems reliability swim out from computations:

- given above equipment work is present in form, comfortable for intuitive perception;

– the visual data is used to manage the method of emotional operator state and to tune maintenance on intuitive perception;

– sound accompaniment duplicates, and attached to necessity and reinforces an emotional tuning; it is must not create the impediments for negotiations.

Such system can be to name a intuitive.

The following tasks can be coped with:

1) determination of amount of objects, which a dispatcher can perceive at the same time (computations, recommendations as for augmentation possibility of normative indexes for condition of correcting groupment);

2) workplace geometry influence estimations on human (state potential, necessary for adaptation, determines an influence degree; disagreements workplace and perception model topologies – its address; groups disparity and symmetry – orders areas of exchanges; absolute sizes and measuring units determine in calibration motion;

3) give the recommendations as for functional workplaces destination of different form, dimensions computation, compensation possibilities;

4) concordance of labor intensity with natural and biological rhythms.

Recognition model (MPP)

Introduce specific definitions of image compactness, images sameness, encoding correctness and recognition reliability [6]. Consider the tasks:

1) exposure of mechanisms of born recognition superiorities, proceeding from image forming sequence and signs priorities in accordance with recognition model;

2) design of prognostic interactive systems (offer the visualization methods and processes development tendencies interpretation).

An operator management actions model is built in appearance object-functional weighed graph [6]. Recommendations for management organs are the choice. Introduce the optimality indexes of their composing (deviation measures, effectiveness, correspondence). Reverberation system decision (codes choice, management motions, suitable technical methods) offers information.

Graphic model of subjective operator space

Introduce a special diagram, quasimetrical attitude, as intercourses of psychological descriptions [7]. For example, distance d introduced as a resemblance measure:

$$d = l + \left|\sin n_k \pi_k - \sin_i \pi_i\right|,$$

where l – amount of transitions between elements layers k and i; π_k, π_i – their potentials; sign={+, modality ⟨;-, modality ⟨↓; 0, modality ↓}.

Testing results reverberation procedure by the medium of such model and notes its superiorities are described. Professional qualities, and also the methods of reaching their research are determined and ranked. Graphic presentation of psychological portrait is given.

The condition of the operator estimations

At data processing and modelling of physiological processes there are problems of selection representative parameters and techniques, the correct organization of process of measurement, definition of units of measurements, weights and mutual conformity of parameters, data presentation, reduction of number of experiments. It is possible to notice, that they are reduced to understanding of the organization, evolution and the description of complete open system, that is they are similar to the example considered above [6]. Geometrical interpretation of problems gives the following picture:

1) choice of group of representative parameters – definition of levels of the organization involved during the work of the operator;

2) conditions of measurement (in laboratory conditions and on manufacture; a choice of intervals; correlation, parameters measured with the certain intervals), accuracy of measurements – openness Sp; its evolution under action of external factors; changeability of coordinate system and S-sets and elements during evolution and the act of measurement, preservation invariants at transitions Sp↔O, the OM metrization;

3) ranging of parameters – definition of weight factors according to levels of the organization;

4) reduction of quantity of experiments and measurements – calibration and calculation of models human – environment, their detailed elaboration, use the OM of different types.

Thus:

– self-organizing Sp determines a choice of parameters and means of measurement (quantities of levels, characteristics, the parameters, the independent techniques of a complex corresponding to any kind of activity, will be equal to Fibonacci numbers; the quantity of sets will be determined by number of researched kinds of activity);

– axioms of measurement determine the possible accuracy of measurements, and the requirement to coordinate system and set of influences S and O – a correctness of conditions of measurement and an opportunity of comparison of results;

– conditions of integrity determine ranging, priority, weight factors, and also represents both lability of parameters and an opportunity of their calculation.

The choice of representative parameters is carried out in the following sequence.

1. Carried out preliminary researches with the purpose to determine the character of primary activity of the operator and the structure of the involved levels of the organization. The corresponding diagram is under construction.

2. According to predicted parameters, the quantity of measured parameters for each of levels is determined and specified.

3. Selection of adequate techniques is carried out.

4. The problem of specialization and universalization is solved proceeding from the following reasons:

– universal (group) parameter for the specialized (individual) parameters interpretive as sets of characteristics From elements, will be a set of their characteristics S-set the Accessory S-elements is determined according to the diagram;

– detailed elaboration of measurements, i.e. use group or and sets of individual parameters, is determined by research problems. Thus it is necessary to mean the big lability of individual parameters.

Conditions of measurement include.

1. A choice of coordinate system (Cs) according to axioms 4,1 and 4,2 [3] instead of metric. Here there is a dilemma: necessity of achievement of accuracy demands a sensible choice, i.e. changeable Kc and corresponding means of measurement, whereas necessity of comparison of the results received at various times and in different conditions – on the contrary, constant Ks. From here follows

2. It is necessary to choose Ks so that at carrying out of repeated measurements there will be an opportunity of its "adjustment", i.e. reduction of a condition will approach to initial, i.e. if the axiom 3,9 [3] is observed.

Further, it is necessary to keep balance of external conditions and used methods of measurement. From here follows not only the usual requirement of carrying out the experiments in identical conditions and on the basis of an identical technique, but also the following position.

3. At impossibility to provide identical conditions of experiments, it is necessary to correct a set of the used techniques in the process of their change proceeding from conditions of integrity.

4. Changeability of the characteristic owing to the act of measurement results in inadequacy of the measured processes given to real characteristics. It is expressed in the loss of sensetive of devices as a result of change of scale of processes, in qualitative changes in character of the researched phenomena, and conducts to their distortion and misunderstanding. Therefore it is necessary.

5. For maintenance of the correctness of measurement procedure it is necessary to minimize its influence on the measured characteristics for the account:

– applications means of the measurement which are not breaking usual industrial conditions;

– the using of system of external indemnifications of the changes occuring due to measurement;

– changes of a set of measurement means in the process of the change of the researched characteristics, proceeding from conditions of integrity.

6. Development of researched process can lead to the change of quantity of its independent characteristics.

7. Therefore it is necessary of provide an opportunity of changing the quantity of used techniques depending on occurrence of new characteristics in the process of development of researched process which agrees with conditions of integrity.

8. It is necessary to observe 1–4, accuracy of measurement is limited to the theoretical conditions resulted in [2].

Ranging of the measured parameters is provided by means of:

– reductions qualitatively various parameters to the homogeneous units of measurements describing any their general consequence which can be connected with potential, and attributings to parameters of the weight factors derivative of potential;

– definitions of specific connection of each concrete parameter with potential, then definition of the corresponding weight factor.

Replacement of experimental data settlement is possible when after statistical processing results become the base hypothesis clear connection describing development of researched process, and one of scripts of organization Sp. It is necessary:

– to range characteristics on layers;

– to determine quantities(amounts) and structure of not measured characteristics;

– to calculate [2] their relative values;

– to determine connection of the measured sizes with potentials;

– to make calibration and to determine absolute values of not measured parameters;

9. Conditions of coordination of parameters of ability to live are conditions of integrity as the human-environment model as a whole, and Sp+ in particular.

10. Limits of adaptation of structures of any level to influence the environment are changes of potentials of parameters of ability to live in the limits which are not resulting in development processes of stratification or convolution, i.e. in a range 1–Ф.

In more common case when process of adaptation distinguis has structures of several levels, necessity of preservation of integrity results.

11. If for the last from the levels involved during adaptation allowable limits of change of parameters satisfy 6, for previous (1, 2..., k, considering from the last) they pay off:

$$\frac{\pi_{i,n} i_n}{\Phi^k i_{n-k}} \div \frac{\pi_{i,n} i_n}{\Phi^{k-1} i_{n-k}},$$

where i – quantity of elements of the last layer n.

12. The conditions making possible occurrence of pathological processes, excess specified in 10–11 limits is.

13. The conditions making possible regeneration, the external influences, allowing to return potentials of parameters of ability to live in the limits specified in 11.

Perfection of the technological systems structure

Let's resume results of modelling for technological system of monolithic frame construction [8; 9].

Definition

The open, complete, organized system providing optimum carrying out of monolithic ferro-concrete works at construction of residential buildings according to external requirements is called as technological system of monolithic frame housing construction.

Thus modules and functional autonomy of system as a whole and subsystems making it is consequence of integrity and the organization; functions universalization – isomorphism of the organization, ability to dynamic mobilization – openness and integrity, prognostic developments and controllability of information streams – self-organization and self-regulation.

By optimization we shall understand creation of such system which reacts to any change of external conditions by change of parameters and functions of the subsystems at an invariance of the organization, i.e. within the limits of self-control. So the mentioned above contradiction is authorized.

According to the given positions, the model of technological system displaying its major characteristics is constructed as 7-levels igraphoanalytical (fig. 2).

Accessory to system of level 0 and symmetry external influence – (structure + function) – obligatory conditions of construction of complete and adaptive system.

Connection volumetric – planning constructive decisions is displayed in connection to components of the technological decision. Management ($S_{2...4}$) as inevitable directive function, breaks natural symmetry.

The structure all in the greater degree is determined directively; this takes place and levels of the organization.

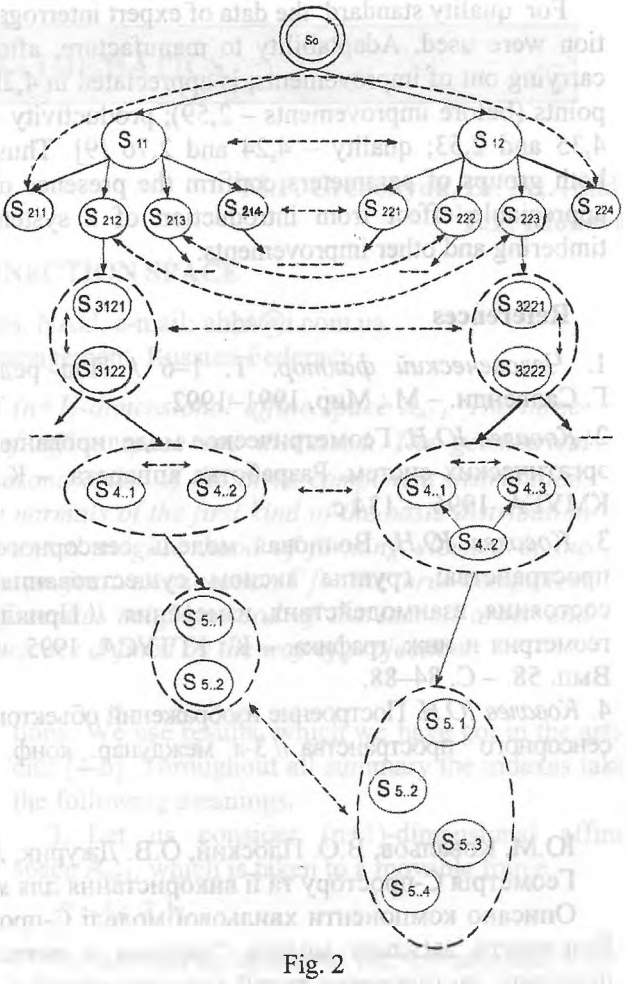

Fig. 2

The analysis of model allows to draw conclusions concerning designing, estimations of an optimality of real systems, updatings of their structures and functions:

$$\Pi_i = \alpha_i \sum_{j=1}^{M_i} p_{ij},$$

where Π_i – a group parameter of a level i; α_i – the factor determining, as far as a group parameter more important the sum of individual parameters; p_{ij} – individual *j-th* a parameter from their general quantity M_i.

Values in points integrated, group and individual parameters, and also factors α, are determined by experts [9].

The estimation of results of introduction was carried out during industrial experiment. Improvement of natural parameters on a unit of production is achieved:

– growth of productivity – 22,5 %;

– reduction of power consumption – 17,5 %;

– reduction of expenses of financial asserts – 27,5 %;

– reduction of terms of construction; reduction of labour input – 22 %.

For quality standard the data of expert interrogation were used. Adaptability to manufacture, after carrying out of improvements, is appreciated in 4,25 points (before improvements – 2,59); productivity – 4,35 and 2,53; quality – 4,24 and 2,76 [9]. Thus, both groups of parameters confirm the presence of appreciable effect from introduction of a system timbering and other improvements.

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Геометрія С-простору та її використання для моделювання й організації складних систем

Описано компоненти хвильової моделі С-простору – аксіоми, теореми самоорганізації, діаграми. Розглянуто загальну модель "людина – навколишнє середовище" й деякі з робочих моделей, приклади застосування теорії самоорганізації С-простору при оптимізації складних технологічних систем.

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Геометрия С-пространства и ее использование для моделирования и организации сложных систем

Описаны компоненты волновой модели С-пространства – аксиомы, теоремы самоорганизации, диаграммы. Рассмотрены общая модель «человек – окружающая среда» и некоторые из рабочих моделей, примеры применения теории самоорганизации С-пространства при оптимизации сложных технологических систем.