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SET AND TRIAD CATEGORIES

Abstract: The set of a system can be modified depending on a triad categories: two polar categories and a category that is an intermediary between them. When the scale of this triad categories cannot realize the necessary adjustment of the set, then the scale of another triad categories joins to it. The joint participation of the both scales in the adjustment of the set requires their mutual coordination. The relative part of one of them grows gradually and it becomes dominant in the behavior of the system.Each of the three categories can rul the set of the system alone or simultaneously with other categories. Each category features a specific adjustment of the set of a system. The purpose of the article is to present a theoretical model of a triad categories that rul the set of a system.

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The structure of some three-elements categories is presented as follows:

- development, instability, degradation:

(1) $$\mathbf{Z}_{\uparrow\updownarrow\downarrow} = \mathbf{Z}_{\uparrow} . \mathbf{Z}_{\updownarrow} . \mathbf{Z}_{\downarrow} ,$$

where $\mathbf{Z}_{\downarrow\updownarrow\uparrow}$ - set of development, instability, degradation,

$\mathbf{Z}_{\uparrow}$, $\mathbf{Z}_{\updownarrow}$, $\mathbf{Z}_{\downarrow}$ - set **Z** development $_{\uparrow}$, instability $_{\updownarrow}$, degradation $_{\downarrow}$.

- neutrality, positivity, negativity:

(2) $$\mathbf{Z}_{+\pm-} = \mathbf{Z}_{+} . \mathbf{Z}_{\pm} . \mathbf{Z}_{-} ,$$

where $\mathbf{Z}_{+\pm-}$ - set of positivity, negativity, neutrality,

$\mathbf{Z}_{+}$, $\mathbf{Z}_{\pm}$, $\mathbf{Z}_{-}$ - set **Z** of positivity $_{+}$, neutrality $_{\pm}$, negativity $_{-}$.

- internal, border, external:

(3) $$\mathbf{Z}_{\vee\varnothing\wedge} = \mathbf{Z}_{\vee} . \mathbf{Z}_{\varnothing} . \mathbf{Z}_{\wedge} ,$$

where $\mathbf{Z}_{\vee\varnothing\wedge}$ – general set of internal, border, external,

$\mathbf{Z}_{\vee}$ - internal set, i. e. set of the system determined by internal factors.

$\mathbf{Z}_{\varnothing}$ - border set, i. e. set of the contact of the system with the external set,

$\mathbf{Z}_{\wedge}$ - outdoor set, i. e. set of the system determined by external factors.

- quality, measure, quantity:

(4) $$\mathbf{Z}_{\mathbf{Q}\text{⧖}\mathbf{q}} = \mathbf{Z}_{\mathbf{Q}} . \mathbf{Z}_{\text{⧖}} . \mathbf{Z}_{\mathbf{q}} ,$$

where $\mathbf{Z}_{\mathbf{Q}\text{⧖}\mathbf{q}}$ - set of measure, quantity, quality,

$\mathbf{Z}_{\mathbf{Q}}$, $\mathbf{Z}_{\text{⧖}}$, $\mathbf{Z}_{\mathbf{q}}$ - set **Z** of quality $_{\mathbf{Q}}$, measure $_{\text{⧖}}$, quantity $_{\mathbf{q}}$.

- total, especial single:

(5) $$\mathbf{Z}_{\int\text{‼}\partial} = \mathbf{Z}_{\int} . \mathbf{Z}_{\text{‼}} . \mathbf{Z}_{\partial} ,$$

where $\mathbf{Z}_{\int !! \partial}$ - set of total, especial single,

$\mathbf{Z}_{\int}$, $\mathbf{Z}_{!!}$, $\mathbf{Z}_{\partial}$ - set **Z** of total ∫, especial !!, single ∂ .

- similarity, indifference, divergence:

(6) $$\mathbf{Z}_{\approx \diamond \#} = \mathbf{Z}_{\approx} \,.\, \mathbf{Z}_{\diamond} \,.\, \mathbf{Z}_{\#} \,,$$

where $\mathbf{Z}_{\approx \diamond \#}$ - set of similarity, indifference, divergence,

$\mathbf{Z}_{\approx}$, $\mathbf{Z}_{\diamond}$, $\mathbf{Z}_{\#}$ - set **Z** of similarity ≈, indifference ✧, divergence #.

The internal set of a system expresses its characteristics which are manifested in its physical limits.

The outdoor set of a system expresses its features, which occur out of its physical limits.

The limit set of a system expresses characteristics of its physical limits.

Transforming the triad in a couple categories

If in a current moment there is interaction between two triads categories that characterize a specific set of a system, then for each of them could be written, that:

(7) $$\mathbf{Z}_{AXB} = \mathbf{Z}_{A} \,.\, \mathbf{Z}_{X} \,.\, \mathbf{Z}_{B}$$

(8) $$\mathbf{Z}_{CYD} = \mathbf{Z}_{C} \,.\, \mathbf{Z}_{Y} \,.\, \mathbf{Z}_{D} \,,$$

where $\mathbf{Z}_{AXB}$ - set of a system of categories **A, X, B,**

$\mathbf{Z}_{A}$, $\mathbf{Z}_{X}$, $\mathbf{Z}_{B}$ - sets of categories respectively **A, X, B,**

$\mathbf{Z}_{CYD}$ - set of a system of categories **C, Y, D ,**

$\mathbf{Z}_{C}$, $\mathbf{Z}_{Y}$, $\mathbf{Z}_{D}$ - sets of categories respectively **C, Y, D .**

The categories A and C have a character of polar categories and category X – of neutral category.

The categories C and D have a character of polar categories and category Y – of neutral category.

The neutral categories are a transition between the meanings of the polar categories. The neutral categories narrow the field of importance of the polar categories. They have ingredients (synonyms) by which they adapt themself to the polar categories with which they communicate:

(9) $$\mathbf{Z}_{X} = \mathbf{Z}_{AX} \,.\, \mathbf{Z}_{XB},$$

(10) $$\mathbf{Z}_{Y} = \mathbf{Z}_{CY} \,.\, \mathbf{Z}_{YD},$$

where $\mathbf{Z}_{AX}$ – set of neutral category X, with which it contacts with set Z_A,

$\mathbf{Z}_{XB}$ – set of neutral category X, with which it contacts with set Z_B ,

$\mathbf{Z}_{CY}$ – set of neutral category Y, with which it contacts with set Z_C ,

$\mathbf{Z}_{YD}$ – set of neutral category Y, with which it contacts with set Z_D .

For example:

- instability with priority to degradation (jumble) and instability with priority to development (non fixed),
- neutrality with priority to negativity (impolite) and neutrality with priority to positivity (neutralization),
- border with priority to external (exterior) and border with priority to internal (imagine),
- measure with priority to quantity (measure) and measure with priority to quality (criterion).

From (7) and (9), it follows that:

(11) $$Z_{AXB} = Z_A \cdot Z_{AX} \cdot Z_{XB} \cdot Z_B \ .$$

From (8) and (10), it follows that:

(12) $$Z_{CYD} = Z_C \cdot Z_{CY} \cdot Z_{YD} \cdot Z_D \ .$$

If:

(13) $$Z_{A'} = Z_A \cdot Z_{AX} ,$$

(14) $$Z_{B'} = Z_{XB} \cdot Z_B ,$$

(15) $$Z_{C'} = Z_C \cdot Z_{CY} ,$$

(16) $$Z_{D'} = Z_{YD} \cdot Z_D ,$$

Then from (7)… (16) it follows that:

(17) $$Z_{AXB} = Z_{A'} \cdot Z_{B'} ,$$

(18) $$Z_{CYD} = Z_{C'} \cdot Z_{D'} .$$

If $Z_{AB} = Z_{CD}$, it:

(19) $$Z_{A'} \cdot Z_{B'} = Z_{C'} \cdot Z_{D'} .$$

If the values of $Z_{A'}$, $Z_{B'}$ and $Z_{C'}$ are known and it is necessary to specify the value of $Z_{D'}$, then from (19) it follows that:

(20) $$Z_{D'} = Z_{A'} \cdot Z_{B'} \cdot Z_{C'}^{-1} \ .$$

Impact

The external disruptive impact is included in the set of balanced system of categories to which it is directed. The external disruptive impact is concentrated to the variable set (Z_D) of a system of categories in the general case. On this basis it follows from (7) that the new condition for equilibrium of the system of categories is:

(21) $$Z_A \cdot Z_B = Z_C \cdot Z_D \cdot Z_W ,$$

where $\mathbf{Z_W}$ - set of a category or a system of categories, which characterize an external disruptive impact.

Z_W expresses a deviation from the norm of Z_D. The system of sets Z_D . Z_W forms a substantial change (increase or decrease) of the set of Z_D .

The structure of Z_W can be with:

- consequtively connected categories:

$$Z_W = \prod_{j=1}^{m} Zj \;, \tag{22}$$

where **Zj –** set of category with index (serial number) j,
m – number of sequentially connected categories j.

- parallel connected categories:

$$Z_W = \prod_{k=1}^{n} Zk^{-1} \;, \tag{23}$$

where **Zk –** set of category with index (serial number) k,
n – number of parallel connected categories k,

- consequtively and parallel connected categories:

$$Z_W = \prod_{j=1}^{m} \prod_{k=1}^{n} Zj \,.\, Zk^{-1} \;. \tag{24}$$

In general the change of Z_D requires changes of Z_A, Z_B or Z_C in order to restore the equilibrium of the system. The external impact Z_W stimulates a change of the importance of the categories, that rul the set of a system.

Electrical model

The equality (20) can be submitted through the arms of an electrical bridge (fig.1).

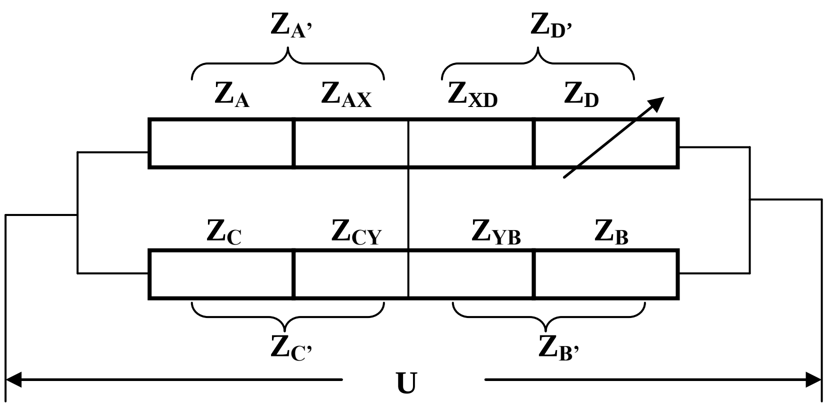

Fig.1. Electrical model (Wheatstone bridge) of the interaction of fixed set Z_{AXB} and Z_{CYD} by power potential U

In general the behavior of a system is a function of multiple categories. If they form groups of thriads categories, their interaction can be modeled by multiple parallel electrical bridges (fig. 2). They form a network of categories that rul the set of a system.

The regulation of the electrical bridges takes place consecutively on the degree of importance of the categories which it modeled. The consistent synchronization is simple for realization and reliably.

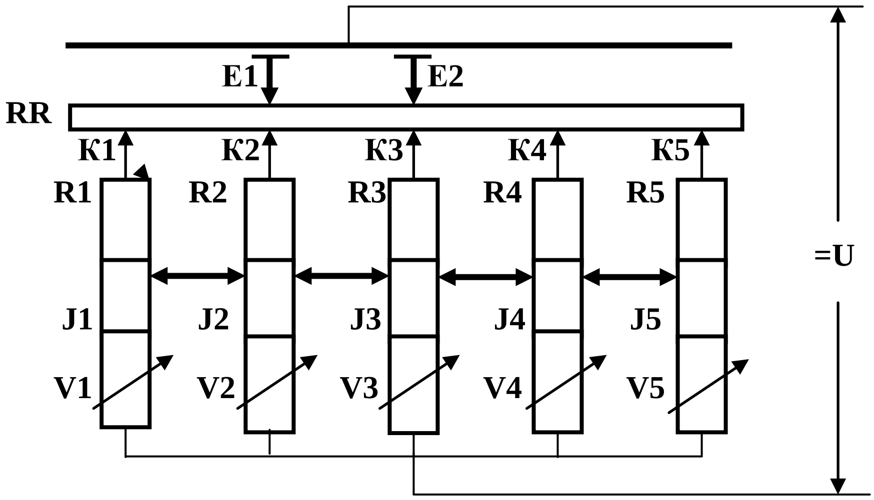

Fig. 2. Electrical scheme for regulation of the participation of categories that rul the set of a system
E1, E2 - sliding contacts
=U - constant voltage
K1, K2, K3, K4, K5 – fixed electrical contacts
RR - resistor model of the relative share of participation of ruling categories in the set of the system
R1, R2 ... R5 – resistor models of fixed sets of categories 1, 2 , ... 5
J1, J2, ... J5 – resistor models of neutral sets of category 1, 2, ... 5
V1, V2 ... V5 – resistor models of variable sets of categories 1, 2, ... 5
⟷ - electrical bridge between neutral sets

One group categories reduces gradually its importance for the rul of the set of a system. Another group of categories increases gradually its importance for the rul of the set of a system.

The gradual modification of the importance of a category is modeled through contacts (7) and (8) (fig. 2). They bind the chains of resistors R2, J2, V2 and R3, J3, V3. The resistor RR reduces current, which flows through the other circuits of the scheme. Respectively other categories involve in the rul of the system to a lesser degree than the categories with indexes 2 and 3.

The figure 3 shows a sample implementation of a physical model of a electric network of sets of categories. The sets of categories are represented as resistors. The peripheral resistors 3 and the central resistors 4 between disk 2 and disk 5 are installed. The disks are conductors of electrical current. The center of the disc 5 is connected to one end of the circuit. Over disk 2 contact strip 1 is suspended on which contacts 7 and 8 slide.

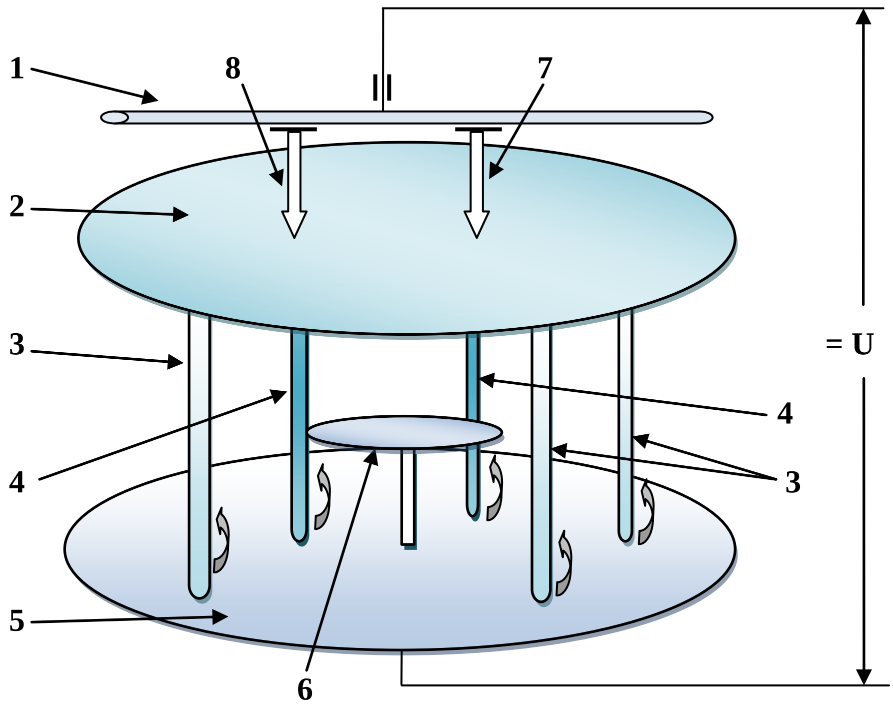

Fig. 3. Spatial electrical model of regulation of categories that rul the set of a system

1 – electrical conductor
2 – disc-resistor RR (fig. 2)
3 – resistors – models of sets of categories with relatively little meaning for the behaviour of the system
4 – resistors-models of sets of categories with relatively high meaning for the behaviour of the system
5, 6 – electroconductive discs
7, 8 – electrical contacts
= U – constant voltage

 **– electrical resistance regulator (shunt)**

Disc 6 in the central part between discs 2 and 5 is situated. It is an electrical bridge between the positions of the resistors, that model neutral sets of categories.

The most significant sets of categories (4 positions) are moved to the central part of discs 2 and 5 and contact with disc 6. Another part of the sets of categories with position 3 go to the periphery of discs 2 and 5. There is an exchange of categories between these groups. The relocation of resistors 3 and 4 on disc 5 by external and internal factors is determined. The structure (fig.3) allows periodical replacement of resistors 3 and 4 with new resistors, i. e. modelling of individual development of set of a system.

The contacts 7 and 8 connect the sets of groups 4 of categories. These categories form the interaction of the system with the external environment in a particular stage of its individual development.

The electrical model (fig.3) adjusts the set of the system only for the main groups 4 of thiads categories. This is the rul of the behavior of a system in first approximation. A finer rul by complication of the structure of the model can be achieved.

The resistors 3 and 4 can be realized as strings (wires). They can form a resonance with each other or with external oscillation. The vibrations form ripples in the currents (for example: by interruption of the contact between 3, 4 and 2, 5).

The structure (fig.3) has signs of an electrical capacitator: positions 2 and 5 are electrical wires, while positions 3 and 4 are resistors. The resistors perform a function of small isolators. The relationship between a capacitator and a resistor form a filter of signal through them. This electrical capacitator smooths the transitional processes by:

- vibration of strings 3 and 4,
- replacement of a group of sets of categories with another group of sets of categories.

The ripples in the currents, which pass through strings 3 and 4 form electromagnetic fields. They induce additional currents in these strings. These currents finely regulate the participation of categories in the rul of the set of a system.

Conclusions

1. **A triad categories can be transformed into a couple polar categories.**
2. **The electrical bridge can model the interaction between triads categories for the rul of the set of a system.**
3. **The presentation of the sets of ruling categories as wires form a model of the set of a system as a bundle of strings. This model connects string theory with the theory of the set.**