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Modelling Of Social Conflict: Socio-Energy Approach

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Annotation

The current article is devoted to reviewing the possibility to present a social conflict and some of its main characteristics through application of mathematics in the context of socio-energy approach.
This line of research is timely due to necessity to create a prognostic apparatus for such events or phenomena.
The methodology includes mathematical modeling approach based on nonlinear dynamics, system approach and Wiener process.
Firstly, the author gives a brief classification of social conflicts, as well as description of science state in this field of knowledge. There are 4 types of conflicts in accordance with their localization and triggering conditions, different subjects and their groups.
There is also presented the foundation of socio-energy approach, its apparatus and idea about the energy flow going through the social system, which is represented using graphical vector imaging. Lineal dynamic model lies in the basis of the socio-energy approach, as well as the elements of fractal geometry for description of intrastructuraldistribution in society.
Three basic theories of social conflict classification were considered: Coser, Darendorf and Boulding. Two main aspects of social conflict were selected:statical and dynamical ones.
As a result, specific generalized statements true for the majority socio conflicts types, as well as mathematically determined conception of social conflict.The conception will allow to create a mathematical model of social conflict based on stochastic differential equations. Such an instrument is able to correctly determinedefinite characteristic common factors of ethnosocial conflicts, including the conditions for their generating and localization.

Key-words: Socio-energy approach, social conflict, Wiener process, mathematical modeling, non-linear dynamical systems, stochasticequitation, system approach, social energy, social deformations.

1. Introduction

Traditionally, social conflict is determined as peak stage of contradictions development in the relations between individuals, groups of individuals, social environment as a whole; this stage is characterized by appearance of contradicting interests, aims, positions of subjects of interaction. The conflicts might be hidden and obvious, but they always have a common ground, which is the absence of compromise and sometimes-even dialogue between and among the parties to a dispute.

British sociologistA. Giddens defined conflict as a real struggle between acting people or groups, regardless the sources of this struggle, its methods and means, used by each side.

There are many classifications following various reasons in the modern sociological literature.

From the perspective of the subjects in conflict, there are four types of conflict:

1) intrapersonal (may take the following forms: role-occurs when conflicting demands are imposed on person concerning the results of his work should be; intrapersonal-can also result from the fact that production requirements are not consistent with personal needs or values);
2) interpersonal (may be reflected as a clash of personalities with different personality traits, attitudes, values, and considered too be the most common);
3) between an individual and a group (it occurs when a person takes a position different from the position of the group);
4) intergroup.

Conflicts can be classified into area in accordance with areas of life into political, socio-economic, national, ethnic, etc.[1].

The study, classification, and most importantly-the prediction of conflicts, have always obtained had a significant place in the fundamental social and political science. This theme was centralin a huge number of studies of leading sociologists, political scientists, etc. : G.Bernard, R.Bailey, K.Boulding, D.Bucher, L.Kozer, L.Krisberg, D. Landis, R.Mark, A.Rapoport, R.Snamaer, R.Stagner, T.Shelling; T.Bottomor, D.Rex; G.Butul, M.Kroze, A. Tur, K.Darendorf; E.Vyatr, Ya.Muha, Ya.Shtumski, Ya.Reykovski, Nechiporenko LA, Petrova II, Handles AL, Semenova LA, Tancher and many others.

The Russian research works devoted to systematic approach to social processes, "general systems theory, individual manifestations of the phenomenon of conflict in different areas of society, from different historical and political circumstances are of fundamental importance. The following aithors should be mantioned: Anufrieva EA, VG Afanasyev, Druzhinin, VV, Katsdelya PE, Krapivin VF, Kontorova D "C Kontorova MD, Nakonechny IG Ovchinnikov BC, the percentage of AF, the Eternal GP VO Rukavishnikov, Sverchkova VB, VI Speransky, Yamskova AI, etc. [1-3].

Indeed, taking into account the considerable impact of such events on the social environment and all the processes going on in it, instruments of prediction and identification of social conflict characteristic patterns are extremely important.

One of these directions in search of solutions to this problem is the prediction and description of social conflict by means of mathematics, ie, mathematical modeling [4-9]. However, before creating a model directly, we must carry out parameterization and create a qualitative description of the processes of the phenomenon under investigation.

In this article the author examines the possibility of presenting social conflict and some of its features with the help of mathematical language in the context of socio-energy approach.

2. Basis of mathematical model

As the basic approach was used "socially-energy approach" developed by the author (SEA). SEA is based on a systematic approach and view of the social system in terms of energy [10]. This view allows us to represent the intra and extra-systematic processes such as modification or redistribution of energy within the system and between systems, taking into account the systemic approach [11], including representation of the internal processes in the system through physical analogy, ie, Wiener processes. In the theory of random processes, Wiener process is a mathematical model of Brownian motion (it is described by the Langevin equation) or a random walk in continuous time [12-15].

This model is based on several basic parameter: the "social energy" or simply "energy"-E. Here, this concept means the quantity that characterizes the potential of the social system do the work.

We believe that in a complex social system, there are two types of primary energy (as introduced above the notion of social energy), which includes all the others:

$E_m = f(E_m^{sc}, E_m^{\Sigma h}, K_d, K_{si})$

Material energy of system, where:

E_m^{sc}-resources energy (if there is any) of social system and its material (tangible) property.

$E_m^{\Sigma h}$-energy of material savings and property of the people living in the system.

$K_{si} = f(\vec{a}, I_I, K_d, K_s)$-scientific and technical progress and system development.

$\vec{a}$-a number of parameters, defining scientific and technical progress in the system.

I_I-transfer function of intersystem information exchange.

$K_s = f(\vec{\beta}, I_I, K_d, N)$-social activity coefficient of moral and ethical society condition.

Coefficients$K_s$andK_{si} exist separately for each individual in the system and cumulative coefficient of the system as a whole is generated throughfractal transformation of all individual values and clusters of the system.

N-number of individuals in the social system.

$\vec{\beta}$-a set of parameters that define the spiritual and moral development and moral state of society and social environment.

The labor energy of people constituting the social system:

$E_h = f\left(K_o, E_h^{\Sigma}, K_d, K_{sc}\right)$

E_h^{Σ}-total labor energy of the family members, which depends on *N (number of individuals).*

Thus, the total social energy of the system has the following formula: $\sum_{i=1}^{n} E_i = E_\Sigma$
Taking it into account, we obtain a model based on differential equations:

$$\sum_{i=1}^{n} \vec{P}_i = \overrightarrow{P_\Sigma}$$

where

$$\overrightarrow{P_\Sigma} = \vec{\chi}\frac{dE_\Sigma}{dt} \quad (1)$$

I.e. energy flow per unit of time in the system, or change the energy used, is subject to an intra-laws. In fact, we use the concept of power that considers the work (energy change), but in our case, since we are interested in the change in energy, it is the same.
$\vec{\chi}$-unit vector of the energy flow direction.
Thus:

$$\vec{P}_\Sigma = \vec{P}_\Sigma^{\,m} + \vec{P}_\Sigma^{\,h} + \vec{P}_\Sigma^{\,out}$$

Then, taking into consideration (1):

$$\vec{j}\frac{dE_m}{dt} + \vec{k}\frac{dE_h}{dt} + \vec{\gamma}\frac{dE_{out}}{dt}$$

As a result-

$$\vec{P}_\Sigma = \vec{j}\left(\frac{dE_m^{\Sigma h}}{dt}K_d K_{sc} + \frac{dE_m^{sc}}{dt}K_d K_{sc}\right) + \vec{k}\left(\frac{dE_h^{\Sigma}}{dt}K_d K_{sc} K_s\right) + \vec{\gamma}\left(\frac{dE^{\Sigma}{}_{out}}{dt}\,\xi(K_d K_{sc} K_s I_l)\right)$$

Or, without external influence:

$$\vec{P}_\Sigma = \vec{j}\left(\frac{dE_m^{\Sigma \mathrm{h}}}{dt}K_d K_{sc} + \frac{dE_m^{sc}}{dt}K_d K_{sc}\right) + \vec{k}\left(\frac{dE_h^{\Sigma}}{dt}K_d K_{sc} K_s\right)$$

This equation of energy flow through the public system. To learn more about this approach, the methods of calculating the coefficients of its features and the mathematical apparatus, as well as other examples of models based on it, refer [10, 15-18].
The flow of energy through the system in a vector can be represented as follows (Fig. 1-Fig. 3)
Vectors describe energy flow direction of individuals or subsystems. Grey-the direction of the system flow dictated by the control subsystem. Black-the direction of the energy flow of individuals and other subsystems specified alternate to the control system.
These figures are offering various options for the direction of energy flow in the system.
Fig. 1 represents a general case. The main energy flows in the suste direction, which is set by the control system, i.e, the state apparatus, but there is a number of subsystems and individuals engaged in the outflow of energy from aspen "bed", thereby reducing overall system efficiency.
Fig. 2 is the ideal system for case when all the sub-systems and individuals are integrated into the overall flow and completely lacking alternative energy flows. Such a system is able to use its own energy with 100 percent efficiency by solving their problems. Clearly, this is an ideal case.

Fig. 3-illustrates the situation when the system is in critical condition, possibly pre-revolutionary when the system contains number of different social conflicts. In this case, the energy is dissipated almost entirely on alternative courses of subsystems and individuals and the system as a whole is unable to deal with any energy-consuming task. As a rule, the emergence of such problems for the system in this state is the latest destabilizing factor that finally turns it into chaos (revolutions, civil wars).

3. Social conflict

There are many concepts of the social conflict theory, so we will take a closer look on the most famous ones.

Concept of L. Coser:

- the public is inherent in the inevitable social inequality = constant psychological dissatisfaction among its members = tension between individuals and groups (emotional, mental illness) = social conflict
- social conflict as the tension between what the reality is and what should be in accordance with the views of particular social groups or individuals;
- social conflict as a struggle for the values and claims to a certain status, power and resources, a struggle in which the objectives are to neutralize opponents, damage to or destruction of the opponent. [19]

The general theory of conflict by Kenneth Boulding:

- All conflicts have common patterns of development = a detailed study and analysis provides the opportunity to create generalizing theory or "a general theory of conflict" that would allow the public to monitor conflicts, manage, predict their consequences;
- Boulding argues that the conflict cannot be separated from the public life (in human nature exists the desire to fight with their fellows);
- Conflict is a situation in which each side seeks to take a position incompatible and opposite to the interests of the other party;
- There are 2 aspects of social conflict: static and dynamic ones. Static is represented by the analysis of the parties (subjects) to a conflict (individual, organization, group) and the relations between them = classification: ethnic, religious, professional. Dynamic aspect examines the interests of the parties as the driving forces in the conflict behavior. = Determination of the dynamics of the conflict = aggregation of responses of the parties to external stimuli [20].

We can determine the following basic statements that are particularly important to us and add some of ours:

1. Conflicts are inevitable in a society, they are born as a result of any social change.
2. The conflict arises in the collision of opposing positions, opinions and interests.

3. Conflict is born by 2 parties, but an unlimited number of them can be involved in it.
4. Any conflict always generates some changes in society.

Fig. 1 (Left) The flow of social energy in the public system in vector form. The general case.

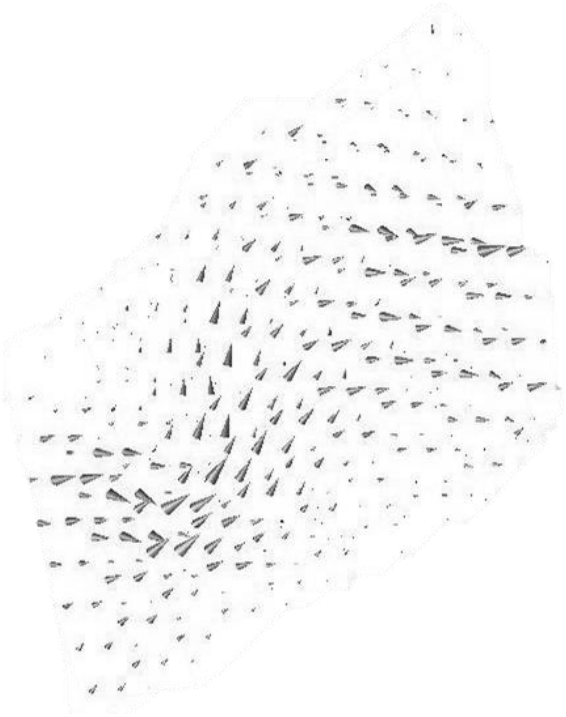

Fig. 2 (Right) The flow of social energy in the public system in vector form. The ideal case.

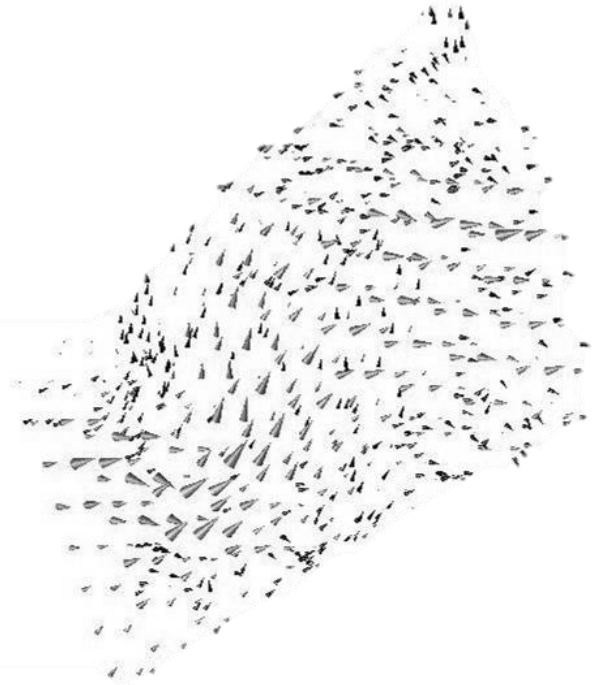

Fig. 3 (Bottom) stream social energy in the public system in the form of a vector. Pre-revolutionary situation.

The conflict model of society by *Ralf Dahrendorf:*

- permanent social changes in society, the experience of social conflict;
- any society based on the coercion of some of its members other = inequality of social positions with respect to the distribution of power;
- difference in the social status of different social groups and individuals of mutual friction = controversy as a result-change of the social structure of the society. [20]

If we translate into mathematical terms, the allegations mentioned above: for a conflict to occur it is required $\nabla\overrightarrow{P_{\Sigma}}$-gradient of social energy flowE_{soc}in the social environment (i.e. the environment, where the social change takes place).

1. The parties to a conflict (system elements) have their positions$\tau = -1$or$\tau = +1$(both positions must be in place, at least one per each position)
2. 2. After a conflict other elements of the system may be included in it by taking one of the sides of theinitial parties $\tau = -1, +1$
3. As a result, re-transfer of social energy$E$takes place in the society.

The presence of numerous causes of conflict increases the likelihood of their occurrence, but it does not necessarily lead to conflict interaction. Sometimes, the potential benefits of participation in the conflict are not worth the cost. However, in conflict, each side usually begins to do everything to ensure that it was adopted point of view, and prevents the other side to do the same. Therefore, in such cases, conflict management, to make them functional consequences (structural) and decrease the amount of dysfunctional (destructive) effects, which, in turn, affect the likelihood of future conflicts.

4. Conclusion

In this regard, we made a mathematical description of the concept of social conflict through social-energy approach. In the future, this description will allow to create a model of social conflict capable of correct displaying the main characteristics of its processes and in special cases based on it(for example, in the case of ethnic and social conflicts).

We also illustrated how the flow of social energy is distributed in the various specific cases of the social environment.

This creates the conditions for the creation of predictive machine for complex social and political processes.

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