General Conflict Management Information Model

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Abstract: - The work proposes a general information model for peaceful resolution of conflicts using which will assist the parties to negotiations to take optimal decisions. The method is universal and can be used in any conflicting situation.

Key words: - conflict situation; conflict management; conflicting parties; interest-expressing functions; information approach; coding theory; statistical material.

1 Introduction
Conflict situations between the opposing parties have existed since the creation of the world, at every stage of its development. The unity and struggle of opposites is one of the main dialectical laws.

Conflicts play a significant role both in the life of individuals as well as in the process of functioning of any social system, families, organizations, society and states. Therefore, a special attention shall be given to the working out of methods of preliminary definition and resolution of conflicts. An important role in this process plays qualified decision-making by experts at any stage of the conflict development, which would facilitate its resolution, making it less acute, predictable and manageable.

2 Problem Formulation
According to synergists [1], the nature has the uniform basis and different phenomena occurring therein can be explained by using a single approach. A question arises, what is that uniformity on which nature is based. As scientists consider today, it should be the laws of thermodynamics – the energy conservation law and the law of entropy growth in a closed system. Our research has led us to the conclusion that information should be primary. It has become possible to discover the information conservation law. Today it can already be said that information is a physical object, the foundation of which in the said direction is rather topical matter and we hope it will acquire special attention in the further development of science. Information approaches in research have general character and enable to solve a whole number of problems in various fields.

3 Problem Solution
To solve the problems set out in the article, the coding theory apparatus and approaches (the coding theory is a component part of information theory) have been used. In order to apply the said approaches, the area of conflicting interests, the so-called channel in the coding theory language, should be investigated.

On the basis of collected statistical data functions expressing interests of both parties will be constructed. Let us conditionally call these functions as the demand and supply functions and designate them as \( D(p) \) and \( S(p) \) respectively. The \( P \) argument in different situations will be different. For example, when we deal with a problem of fixing the optimum market price of a definite kind of goods, \( P \) argument will be the price of the goods expressed in money units. The opposing parties are the buyer and the seller. When we deal with the problem of training, where the teacher-pupil, lecturer-student are the opposing parties, \( P \) argument will represent the acquisition of knowledge, \( D(p) \) and \( S(p) \) will be the knowledge demand and the knowledge supply functions respectively. When we deal with peaceful negotiations between states, the demand and supply functions will be the compromise-dependent functions. When dealing with legal/court proceedings, the demand and supply functions will be the country law functions, while the opposing parties – the state accuser [public prosecutor] and the defense counsels [advocates]. When dealing with the patient and illness, the demand and supply functions will be the organism’s immunity functions. Many other examples can be cited where an agreement of the opposing parties plays an
important role for the sound existence of mankind and nature.

\[ S(p) \quad D(p) \]

\[ K \]

\[ p' \]

Fig. 1

Since the demand and supply functions express interests of the opposing parties, their diagrams on the unified coordinated space shall, as rule, intersect. The point of intersection \( K \) is the best agreement point. In this case interests of both parties are satisfied. The left side of point \( p' \) indicates that one of the parties is dissatisfied, whereas the right side – that the other party is dissatisfied. The functions’ curves may change location in different cases. The curves’ construction is carried out on the basis of the gathered statistical data, using the least-squares method. When the obtained statistical data are given in figures, for example, during observation of one kind of goods on the market, the quantity of the demanded and supplied goods is given in figures, while the price is expressed in money units, the problem is solved relatively easier. Sometimes, however, the obtained test (a priori) material has a semantic rather than numerical expression. In such a case, the semantically expressed data must be transformed into numerical data. This problem somewhat complicates the use of the said method. The reason thereof is that in each individual case the semantics establishment method should be defined. There is a semantic definition method [2], the application of which can, subject to the proper transformation, be used in the solution of different problems.

Let us present the method so that make it applicable for any cases.

Say the semantic material to be considered contains the \( N \) problem and the \( M \) concept necessary to highlight the given issue. If the number \( k \) concept during consideration of the complete material is repeated \( v_k \)-times

\[ k = (1,2,\ldots,M), \quad P_k = \frac{v_k}{Z} \]

is the a priori probability of the \( k \) number concept or weight, during complete consideration of the problem. Where \( Z \) is the quantity of repeated concept the average information per concept

\[ I = -\sum_{k=1}^{N} P_k \log_2 P_k \]

the information falling on the \( i \)-problem will equal

\[ I_i = \mu_i I \]

where \( \mu_i \) is the quantity of concepts used in considering the \( i \)-problem. The complete information containing all the matters to be highlighted shall be

\[ I_{\text{full}} = \sum_{i=1}^{N} I_i \]

Therefore,

\[ I_{\text{full}} = \sum_{i=1}^{N} \mu_i ( -\sum_{k=1}^{N} P_k \log_2 P_k ) = -Z \sum_{i=1}^{N} P_k \log_2 P_k \]

\[ = -Z \sum_{i=1}^{N} \frac{V_k}{Z} \log_2 \frac{V_k}{Z} \]

Whereas

\[ \sum_{i=1}^{N} \mu_i = \sum_{i=1}^{N} V_k = Z, \quad \sum_{i=1}^{N} P_k = 1 \]

The article will deal in brief with a compromise model of the settlement of oppositions between states. As referred to above, in such a case the material presented by the parties in the course of negotiations shall have only the semantic nature.

The interest-expressing functions shall, as have already been mentioned, be the concession-compromise ones. The purpose of the model is to attain an optimum compromise, so that neither party, in the case of agreement, is dissatisfied. The model will assist the negotiating parties to take a right decision in the course of negotiations. In this case, the concepts are the norms of international law, the decisions and resolutions adopted by United Nations and Security Council, regulations of other international organizations (for example, OSCE), as well as the constitutions of the conflicting countries.

As seen above, in the ideal case the interest-expressing functions will be expressed on the unified coordinate space as shown in Fig. 2.
Here, \( P' \) is a compromise. Where the compromise is small, small will be claims of one of the parties. In such a case, claims of the other party will increase. It will attempt to impose its interest on the first party.

To achieve this, it will resort to international laws that answer its interest, even if they are not finally established by international organizations in respect of the problem (for example, the inviolability of territorial integrity, the right of nations to self-determination are incompatible for the present-day separatist regimes). It will apply to these laws repeatedly in order to make its arguments more convincing.

Where concessions are significant, the first party will strengthen its claims to get from the other party as much benefit as possible as a result of the concessions.

It is possible that the parties find such arguments that would enable them to move the optimum point \( P' \) to the side that suits best (the so-called “back” – the channel capacity in the information language) in order to control the process.

In the considered model, by using the aforementioned algorithm, the content of negotiations is transformed into the numerical representation. Information expressed in entropic units, such, for example, as bits (semantic entropy is implied), is measured on the axes of coordinates.

When, by using the statistical material, the interest-expressing functions are constructed, the optimum point \( P' \) to the side that suits best (the so-called “back” – the channel capacity in the information language) in order to control the process.

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Let us consider the optimum agreement value determination algorithm [4].

Say the class \{a\} characterizes the optimum agreement value and the class \{b\} the agreement value produced as a result of distortion (deviation) at the given moment of time.

The following four options may take place in this case:

1. If the deviation \( \varepsilon = b - a \) is positive and \( \varepsilon \leq \varepsilon_{\text{max}} \), then for the deviation localization and correction it is necessary that \( \varepsilon \) be subtracted from the agreement value \( b \).
2. When \( b - a \) is negative and its absolute value exceeds the absolute value of \( \varepsilon_{\text{min}} \), then the addition of \( \varepsilon \) to the module value \( \varepsilon \) shall be subtracted from \( b \).
3. If the deviation \( \varepsilon = b - a \) is negative and \( |\varepsilon| \leq |\varepsilon_{\text{min}}| \), then the value \( |\varepsilon| \) shall be added to the value \( b \).
4. If \( \varepsilon = b - a \) is positive and it exceeds \( \varepsilon_{\text{max}} \), then its addition to the module shall be added to \( b \).

References:


