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V.A. Kasianov, Dr, A.V. Goncharenko, Dr
(National Aviation University, Ukraine)

Alternatives and subjective entropy paradigm context in regards with the conflicts theory

A new approach to the conflict theory implies the subjective entropy paradigm implementation to the interpretations of the leading edge conflicts understanding. The examples of a conflict situation computer simulation are illustrated with the related diagrams.

The theory cornerstones.

The most important thing of the theory is the optimization principle stating that human psych functions in some optimal way [1-4].

This statement is identical to the statements that conflicts, we are discussing below, are the psychological problems of both separate subjects and groups of subjects. We will mention major elements of the theory.

First of all, there are two types of preferences introduced:

#1. Object preferences coefficients $\pi_t(\sigma_i)$, where σ_i denotes one of the alternatives from the set of S_a, $\left(i \in \overline{1,N}\right)$.

#2. Rating preferences coefficients $\xi_t\left[k_j\middle|(\sigma_i,\ldots)\right]$, where k is the number of the subject in the group of S_ξ, $\left(j \in \overline{1,M}\right)$.

$\pi_t(\sigma_i)$ and $\xi_t\left[k_j\middle|(\sigma_i,\ldots)\right]$ are supposed to be normalized.

In parallel, it is introduced the subjective conditional:

$$H_\xi = -\sum_{j=1}^{M} \xi_t\left[k_j\middle|(\sigma_i,\ldots)\right] \ln \xi_t\left[k_j\middle|(\sigma_i,\ldots)\right], \qquad (1)$$

and unconditional:

$$H_{\xi_j} = -\sum_{j=1}^{M} \xi_j \ln \xi_j \qquad (2)$$

entropies; the subjective risks:

$$R_{SB} = \sum_{i=1}^{N}\sum_{j=1}^{M} c_{ij}\xi(\Sigma_j)\hat{p}\left(a \in A_i|\Sigma_j\right), \qquad (3)$$

where c_{ij} is the price when the i^{th} alternative and j^{th} subject are in the consideration, Σ_j is the utility of the subject j, $\hat{p}\left(a \in A_i|\Sigma_j\right)$ is the subjective probability [5], a is

the parameter for a decision making, A_i effectiveness of the alternative i; close to the *Bayes'* ones.

For a case of the two alternatives and the two ratings of the corresponding two subjects, equations (1)-(3) yield formula (4), [4, Volume II, Chapter 8, § 8.5.4, p. 626, (8.51)], http://kasianovv.wixsite.com/entropyofpreferences:

$$R_{SB} = c_{11}\xi(\Sigma_1)\hat{p}(a \in A_1|\Sigma_1) + c_{12}\xi(\Sigma_2)\hat{p}(a \in A_1|\Sigma_2) +$$
$$+ c_{21}\xi(\Sigma_1)\hat{p}(a \in A_2|\Sigma_1) + c_{22}\xi(\Sigma_2)\hat{p}(a \in A_2|\Sigma_2). \qquad (4)$$

The risk described above (3) and (4), also can be expressed through the so-called cognitive function, which is close, in it sense, to the utility function, and speaking more precisely, can be expressed through the mutual utility used in [4].

The mutual utility, in its turn, depends upon the object preferences of the first kind #1 and the ratings #2 of the taking into account subject at the previous moment of time.

So, the algorithm of the conflict indexes calculations comprises the following four steps:

1. Determination of the first kind preferences distribution #1 at the moment t. In order to make that, it is necessary to use the functional constructed in relation with the preferences of the first kind.

2. Determination of the second kind preferences (ratings) distribution #2 at the previous moment $t-1$. In order to make that, it is necessary to use the functional constructed in relation with the cognitive function and mutual utility function.

3. Determination of the ratings (conditional ratings) at the moment t. For that purpose, we have write the functional with respect to the ratings preferences at the moment t.

4. Now, it is possible to calculate the criteria of the conflicts situations tension (stress) ratings.

Calculation examples.

Results of the realizations of the conducted computer simulations are illustrated in Figures 1-4.

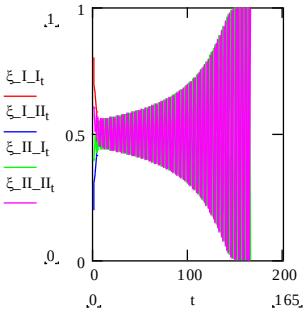

Fig. 1. Ratings dynamics

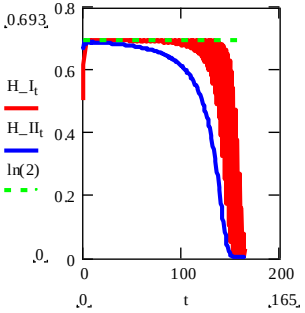

Fig. 2. Entropies dynamics

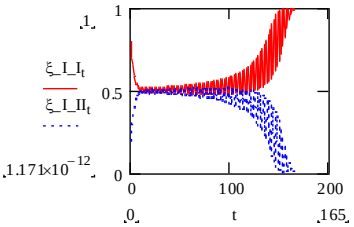

Fig. 3. First subject's ratings dynamics

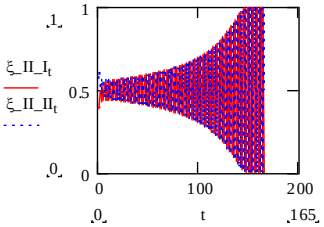

Fig. 4. Second subject's ratings dynamics

The conflict modeled and shown in Figures 1-4 is resolved into the distinguished ratings distributions (see Figures 1, 3, and 4) with the personal certainties traced in Figure 2. Other applications can be found in [6-38].

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