IN CONDITIONS OF RISK AND UNCERTAINTY TO ACCEPT THE SOLUTION

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ABSTRACT

In the article, one of the topical issues of game theory and process research is the methods of choosing a solution under risk conditions. This article can be used by students and teachers interested in game theory and cooperative issues.

Keywords: *nature, risk, optimal solution, maximum, minimum.*

INTRODUCTION

Games with two participants discussed above can be considered as fully analyzed. Because in this,165 the optimal strategies of the players and the game evaluation of the game.It was decided based on its content. But this is the case when the number of participants is more than two it is impossible to say the idea, that is, to completely fulfill all natural requirements the theory reflected in it was not created. First in this direction Von Neumann and Morgenstern have achieved important results the studies in his monograph are noteworthy. The main idea of the theory presented in this monograph is to divide the players into two groups (coalitions) and to play the game with zero players. Is to bring it to a summation game. [1]

METHODS

It is allowed to form a coalition in a game with n participants if so, such a game is called a cooperative game. The root of coalition S is denoted by v(s). If the winnings consist of zero and one 150 such a game is called a simple game. Players in simple games again is determined by the Shepley vector. This vector is uniquely defined based on Shep Lee's three axioms. If we denote the number of elements of coalition S by s, then the components of the Shepley vector are as follows is determined by appearance. [1]

RESULTS

Taking a solution in the face of risk is called a game with nature. Because the second participant can be equated with nature. In this case, nature certainly does not want to harm us on purpose. That is, the enemy is not an intelligent person. However, the situation he created can be very important for us. Let these cases be known and denoted by $\theta_1, \theta_2, \theta_3, \dots, \theta_n$. Let our decisions (solutions) be $\alpha_1, \alpha_2, \dots, \alpha_n$. Let's suppose that when we make such a decision, nature has created such a situation. In that case, the profit we get (profit, income, profit) should be equal to ω_{ij}. We express it in the form of the following table:

	θ_1	θ_2	$\dots$	θ_n
α_1	ϖ_{11}	ϖ_{12}	$\dots$	ϖ_{1n}
α_2	ϖ_{21}	ϖ_{22}	$\dots$	ϖ_{2n}
$\dots$	$\dots$	$\dots$	$\dots$	$\dots$
α_m	ϖ_{m1}	ϖ_{m2}	$\dots$	ϖ_{mn}

In the case of the game with nature, the goal is to choose among the solutions $\alpha_1, \alpha_2, \dots, \alpha_n$ without knowing which of the states $\theta_1, \theta_2, \theta_3, \dots, \theta_n$. A number of methods have been proposed to achieve this goal, they are called Gurwitz, mathematical expectation maximization, Laplace, minimax, maximin, Savidge and Hodja-Lehmann.

Matter. Find suitable solutions using the above methods on the basis of the table about the game with nature given below. Where $p_1 = \frac{1}{4}$, $p_2 = \frac{1}{2}$, $p_3 = \frac{1}{4}$, $p_4 = 0$, $\beta = \frac{1}{4}, \gamma = \frac{1}{4}$.

$$W = \begin{vmatrix} 2 & 1 & -2 & 3 \\ 3 & 5 & -3 & 0 \\ -2 & 4 & 1 & 5 \\ 0 & 3 & 5 & 1 \end{vmatrix}$$

Solving. Hurwitz method $\omega_1^* = \underset{j=1,2,3,4}{max} \omega_{1j} = \max(2,1,-2,3) = 3$, $\omega_2^* = \underset{j=1,2,3,4}{max} \omega_{2j} = \max(3,5,-3,0) = 5$, $\omega_3^* = \underset{j=1,2,3,4}{max}$. $\omega_{3j} = \max(-2,4,1,5) = 5$, $\omega_4^* = \underset{j=1,2,3,4}{max} \omega_{4j} = \max(0,3,5,1) = 5$

$$\omega_{1*} = \underset{j=1,2,3,4}{min} \omega_{1j} = \min(2,1,-2,3) = -2$$

$$\omega_{2*} = \underset{j=1,2,3,4}{min} \omega_{2j} = \min(3,5,-3,0) = -3$$

$$\omega_{3*} = \underset{j=1,2,3,4}{min} \omega_{3j} = \min(-2,4,1,5) = -2$$

$$\omega_{4*} = \underset{j=1,2,3,4}{min} \omega_{2j} = \min(0,3,5,1) = 0$$

Now we define ω_i:

$$\omega_1 = \frac{1}{4}\omega_1^* + \left(1 - \frac{1}{4}\right)\omega_{1*} = \frac{1}{4} \cdot 3 + \frac{3}{4} \cdot (-2) = \frac{-3}{4}$$

$$\omega_2 = \frac{1}{4}\omega_2^* + \left(1 - \frac{1}{4}\right)\omega_{2*} = \frac{1}{4} \cdot 5 + \frac{3}{4} \cdot (-3) = \frac{-4}{4} = -1$$

$$\omega_3 = \frac{1}{4}\omega_3^* + \left(1 - \frac{1}{4}\right)\omega_{3*} = \frac{1}{4} \cdot 5 + \frac{3}{4} \cdot (-2) = \frac{-1}{4}$$

$$\omega_4 = \frac{1}{4}\omega_4^* + \left(1 - \frac{1}{4}\right)\omega_{4*} = \frac{1}{4} \cdot 5 + \frac{3}{4} \cdot 0 = \frac{5}{4}$$

$$\underset{i=1,2,3,4}{max} \omega_i = max\left(\frac{-3}{4}; -1; \frac{-1}{4}; \frac{5}{4}\right) = \frac{5}{4}$$

Therefore, it is necessary to choose solution α_4.

CONCLUSION

Process research gives students a full picture of the mathematical blinders of the subject and specific examples areas where process research methods are used must have shown. If the student solves his work When focused on the field of reception, the effort to absorb this information creates a lack of confidence in the student. The student has deep knowledge of the mathematical basis of process research after acquiring, mastering the achievements in this field and with a practical study of real problems in the field can increase his training level.

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