STRATEGIC INFORMATION AND NON-COOPERATIVE GAMES

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The concept of information is one of the chief essentials in the game theory and it is quite distinct from that of Wiener and Shannon. If one speaks of information in Wiener-Shannon's sense as 'selective', then von Neuman's sense could be called 'strategic'.

The theory of games may be viewed as a formal model embodying three principal elements: (1) the preferences of the players of a game; (2) the choices or decisions open to them at each move; (3) their information regarding the choices made by the opponent player at previous moves.

Strategic information in a game-situation is represented by partitions in a finite set of possibilities, or 'plays'. It is the means of expressing a player's state of knowledge, at any move of a game, regarding the choices which have been made at earlier moves. The problem of rational choice of a plan of action and the existence of equilibrium situations are both closely related to the nature of the information pattern of the game.

If we set in a game-situation both the choices and preferences for the players symmetrically, then if, moreover, the information pattern is fair for all players in the game, that is, if each player, for example, is completely ignorant of the choices of his opponents, the value of the game is zero and the optimal strategy, when it existed, is common to all players. If we set the choices and preferences of the players symmetrically in a game-situation, and if we let the information pattern be unfair, then symmetry of the game disappears. Consider, for example, the case where the player I must take the first move in the game and his choice is told to the player II who can use this information and act optimally at the second move. It is, as our common sense tells us, clear that the player II stands in favor.

We shall, in this paper, show somewhat numerically this type of information-unbalance by examples of continuous poker models. Our method of the analysis owes to Karlin and Restrepo [1].

EXAMPLE 1. *La relance* (two-person stud poker with a single bet).
In our model the unit interval is taken as the representation of all possible hand that can be dealt to a player. Each hand is considered equally likely and therefore the operation of dealing a hand to a player may be considered as equivalent to selecting a random number from the unit interval according to the uniform distribution. The game proceeds as follows: An ante of 1 unit is required by each of the two players I and II. At the beginning of a play