

Abstract (in English):

Character of the work is purely theoretical and it pursues game theory in the perspective of mathematical logic and probability. The work is divided into two parts. Introductory part compiles basic concepts and definitions, summarizing the game theory and basics of syntax and semantics of mathematical logic and its extensions suitable for work in the field of game theory. Introductory part also explains following terms: extensive and strategic form of games, Nash equilibrium, pure and mixed strategies, winning strategies or independence-friendly logic. The problems solved in the second part of the work such as question of existence of Nash equilibrium in the games with infinite models or issue which arises when trying to uniformly distribute the probability of strategies in the same class of games are sketched out. The second part continues with analysis of strategic games with imperfect information aiming to the solution of nontrivial problems earlier proposed. Second part also introduces basic concepts and definitions of the probability theory, which helps comprehending the problems mentioned above. The last part of the work before the very presentation of some results induced by the area of infinite games is conversion between strategic and extensive games form. In the end of the second part I propose a way to handle the problems that arose with respect to the extension of the class of games in our interest from finite to infinite. First issue, existence of Nash equilibria in the class of infinite games, is dealt with by using generalization of Kakutani fixed point theorem published by Irving Glicksberg. Second issue, connected to the distinction of the finite and countable additivity can be under certain conditions fixed by defining the value of given game through limits of the sequences represented by the values of models extending in sequence.