

Review report on the master thesis “Methods of Constructing Characteristic Function in Network Game” by Semenov Valery

In the thesis, the heuristic computational methods for two different but similar problems of computation of characteristic functions are proposed.

In the first case, it is supposed that the cost matrix in the network connecting players as nodes is given. It is supposed that each player can realize connections with given players from a given set (different for each player) and the number of his neighbors is limited (the limits are also different for different players). Under these conditions, it is necessary to find an algorithm which for a given subset of players (coalitions) generates a sub network among the players in the coalition minimizing the total cost of all connections.

The problem is pure combinatorial and at this moment no algorithm for solving it is known. Mr. Semenov proposes in his thesis an algorithm which is realized on a computer, but the correctness is proved not theoretically but comparing the results on examples which can be solved directly. For a large number of nodes, the proposed algorithm requires (complexity  $n!$ ) the use of supercomputer which unfortunately Mr. Semenov could not reach.

In the second case, it is supposed that the communication network is given and players cooperating have to maximize the total coalitional payoff selecting corresponding controls (strategies). Also for this problem, an algorithm is proposed and realized on computer. And as in the previous case, the correctness was exposed to examples by comparing the results with already known cases.

Mr. Semenov shows sufficient knowledge in game theory and outstanding possibilities in computing. The codes of presented programs contain many hundreds of lines.

I evaluate the thesis as “Excellent”

Supervisor, professor,  
Leon Petrosyan  
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