

Review report on the Master Thesis
Cooperative games on hypergraphs

By Kosian David

The thesis is devoted to the investigation of relatively new class of network games – games on hypergraphs. The main problem was to implement cooperative game theory approaches to this class of games. Kosian proposed a two level cooperation approach in this case which seems to be reasonable. First the cooperation between coalitions of players (represented as “cloud”s) and then the cooperation of players inside the “cloud”. The most difficult problem as usual was the construction of characteristic function on both levels. For coalitions of clouds (or hyperlinks) the value of characteristic function is defined as maximal total payoff under condition that members of the cloud belonging also to hyperlinks outside the coalition are maximizing the payoffs of outer hyperlinks. To define the payoffs of coalitions inside the cloud (hyperlink) the maxmin approach is used. After defining the characteristic function on both levels a nontrivial approach is used to define the allocation rule for players. The explicit solution is found for the flower-type hypergraph and many examples are presented to illustrate the more general cases.

The results of the thesis are also included in two papers which will come out in few months and indexed in Russian citation index e-library.

Also the results were presented on the International Conference “Stability and Control Processes” this year.

Mr. Kosian shows the ability of independent scientific research. There are many minor mistakes and minor incorrect statements, but since the work contains new interesting scientific results I think that the evaluation as “Excellent” is possible.

Supervisor

Professor Leon Petrosyan

05.06.2019

