

Fair division problems on graphs

Z. Lonc

Warsaw University of Technology, Poland

Fair division problems have been vastly studied in the past 60 years. This direction of research was initiated by a paper by Steinhaus in 1948 in which he introduced the cake cutting problem. Most work in the area has been concentrated on fair division of divisible goods (continuous structures). In the talk we shall mainly consider the fair division problem for *indivisible* goods. The problem assumes a set of (indivisible) elements, referred to as goods, and a collection of agents each with her own utility function on the sets of goods. The objective is to assign to agents disjoint subsets of goods (shares) in a way that meets some fairness criteria.

In a variant of the problem, motivated by some applications, we assume existence of some structure in the set of goods. More precisely, goods are vertices of a graph and we demand that the shares assigned to the agents form a connected subgraph. We shall review recent progress in studying existence, construction and computational complexity questions for fair division problems of indivisible goods for both some classical notions of fairness like proportionality or envy-freeness and some new ones like maximin or minimax share criteria which were proposed quite recently.