Geometry and combinatorics of fair division

Florian Frick

(Cornell University)

Abstract

Sperner's lemma is a combinatorial version of Brouwer's fixed point theorem and states that if the vertices of a triangulation of an *n*-simplex are colored by n + 1 colors following certain simple rules, then there is a face of the triangulation that exhibits all n + 1 colors on its vertices. This talk focuses on extensions of Sperner's lemma and related results and applications to problems of fair division. In particular, this approach yields an algorithm for how to fairly divide rent such that n frugal roommates with subjective preferences will not be envious of each other even if the preferences of one roommate are unknown.

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