TOMAŽ PISANSKI, IMFM, University of Ljubljana and University of Primorska

Dimension of unsplittable incidence structures

A combinatorial incidence structure $C = (P, L, I)$ consists of 'points' P, 'lines' L, and an incidence relation I between them. The corresponding bipartite incidence graph is sometimes called the Levi graph of the structure.

A collection of points and lines in the Euclidean space defines a geometric incidence structure. Each geometric incidence structure determines a unique combinatorial incidence structure. The converse is not true. An incidence-preserving mapping of 'points' and 'lines' of a combinatorial incidence structure C to points and lines of an Euclidean space is called a representation of C.

$\dim(C)$ is the maximum dimension of the affine span of any geometric incidence structure representing combinatorial incidence structure C.

G-graph is the graph square of the Levi graph of an incidence structure C. An incidence structure C is unsplittable if by removing any set of vertices independent in G-graph from the Levi graph of C, the Levi graph remains connected. This talk will indicate some problems concerning the dimension of unsplittable incidence structures in particular for some combinatorial or geometric configurations.

This is joint work in progress with Branko Grünbaum.