

Incidence structures, codes, and Galois geometry

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The lecture discusses a new invariant for finite incidence structures based on linear codes and Galois geometry, which has both an algebraic and a geometric description, and is motivated by the longstanding Hamada's conjecture about the minimum p -rank of the classical geometric designs. The new invariant was used recently in a joint work of the speaker with Dieter Jungnickel to prove a Hamada type characterization of the classical geometric designs having as blocks the d -subspaces of an n -dimensional projective or affine geometry over a finite field of order q .

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Keywords: incidence structure, combinatorial design, finite geometry, p -rank, linear code, trace code, Galois closed code, Hamada conjecture.

Section: 14.