Abstract

Arcs and Blocking Sets in Projective Hjelmslev Planes over Finite Chain Rings

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In this talk , we survey some recent results on arcs and blocking sets in projective Hjelmslev planes over small chain rings. The talk is structured as follows:

1. Finite chain rings – definition, properties and classification
2. Modules over finite chain rings
3. Projective and affine Hjelmslev geometries
   - 3.1. Definition of $\mathrm{PHG}(R_R^k)$ and $\mathrm{AHG}(R_R^k)$
   - 3.2. The structure of the projective and affine Hjelmslev planes
   - 3.3. Combinatorial properties
   - 3.4. Multisets of points
4. Arcs in small Hjelmslev planes
   - 4.1. General bounds on the size of an arc in a projective Hjelmslev plane
   - 4.2. Ovals and hyperovals
   - 4.3. The dual construction for arcs
   - 4.4. A construction using Singer cycles
5. Blocking sets
   - 5.1. General results for blocking sets
   - 5.2. Rédei type blocking sets