Point sets with few intersection numbers in projective spaces

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Abstract

Many problems in finite geometry follow the following pattern: say we have a set of points in a plane, and require that some combinatorial property holds. Can we say something about the algebraic structure of this set? And what if we impose some extra symmetry conditions?

By far the most famous example of such a theorem is Segre’s beautiful characterisation of conics in a Desarguesian projective plane of odd order $q$ (1955): every oval (which is a set $C$ of $q + 1$ points such that no line contains more than 2 points of $C$) is the set of points of a conic.

In this talk, we will explore some classical results about ovals and hyperovals and present more recent results of the same flavour about KM-arcs and quasi-quadrics.