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.