

A characterization of quadrics by intersection numbers

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Abstract

This work is inspired by a paper of Hertel and Pott on maximum non-linear functions [3]. Geometrically, these functions correspond with quasi-quadrics; objects introduced in [1]. Hertel and Pott obtain a characterization of some binary quasi-quadrics in affine spaces by their intersection numbers with hyperplanes and spaces of codimension 2.

We obtain a similar characterization for quadrics in projective spaces by intersection numbers with low-dimensional spaces. Ferri and Tallini [2] characterized the non-singular quadric $Q(4, q)$ by its intersection numbers with planes and solids. We prove a corollary of this theorem for $Q(4, q)$ and then extend this corollary to all quadrics in $PG(n, q)$, $n \geq 4$. The only exceptions we get occur for q even, where we can have an oval or an ovoid as intersection with our point set in the non-singular part.

References

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- [3] D. Hertel and A. Pott. A characterization of a class of maximum non-linear functions. *Preprint*, 2006.