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A Hilton-Milner theorem for exterior algebras

A set family F is pairwise-intersecting if every pair of its members intersect. In 1960, Erdős, Ko, and Rado gave an upper-bound on the size of a pairwise-intersecting family of k -sets coming from a ground set of size n . Moreover, they characterized the families achieving the upper-bound. These are families whose members all share exactly one element, so called trivial families. Later, Hilton and Milner provided the next best upper-bound for pairwise-intersecting families that are not trivial.

There are several generalizations of the above results. We will focus on the case when the set family is replaced with a subspace of the exterior algebra. In this scenario intersection is replaced with the wedge product, being pairwise-intersecting with self-annihilating and being trivial with being annihilated by a 1-form. Scott and Wilmer, and Woodroffe gave an upper-bound on the dimension of self-annihilating subspaces of the exterior algebra. In the current work we show that the better upper-bound coming from Hilton and Milner's theorem holds for non-trivial self-annihilating subspaces.

This is a joint work with Francesca Gandini and Russ Woodroffe.