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GRASSMANN SPACES OF REGULAR SUBSPACES

There are numerous works in the area of geometry that deal with quadrics, or a bit more generally, with polar spaces. There is also series of papers devoted to so-called copolar spaces that can be viewed as complementary to polar spaces. They arise by negation of the one-or-all axiom of polar spaces, that is, by introducing of its dual none-or-all-except-one axiom. As far as polar spaces are strictly tied to isotropic subspaces in a metric-projective or a metric-affine space, copolar spaces emerge from regular subspaces, that is, those subspaces with trivial radical.

Another motivation to investigate regular subspaces is that they come from reflection geometry, developed by Bachmann in seventies of the last century, a quite natural language in which a geometry is characterized in terms of its admissible reflections. Axes of such reflections are exactly those subspaces which we call regular. The concept of regular subspaces can be adopted in metric-projective as well as in metric-affine geometry.

The current talk deals with incidence systems, namely Grassmann spaces associated to the family of regular subspaces of a vector space equipped with a symmetric bilinear form. The points of such a system are *k*-dimensional regular subspaces and the lines are pencils of these subspaces. We prove that the underlying metric-projective as well as metric-affine geometry can be recovered from our Grassmann spaces associated with the family of regular subspaces of respective space. In other words, automorphisms of such Grassmann spaces are collineations witch preserve orthogonality of the respective underlying space.