Mariusz ŻYNEL
University of Białystok
Institute of Mathematics, Department of Foundations of Geometry
ul. Akademicka 2 15-267 Białystok
tel./ fax: 85 745 75 52, e-mail: mariusz@math.uwb.edu.pl

AFFINE POLAR SPACES

Affine polar spaces arise from polar spaces the same way affine spaces arise from projective spaces, by deleting a hyperplane. That way we get a new, interesting geometry. Another approach is also possible. As far as a polar space can be viewed as a structure of self-conjugate points and isotropic lines in a projective spaces equipped with a polarity, an affine polar space can be viewed as an affine space with isotropic lines only. In our preferred settings we take a vector space with a non-degenerate symmetric bilinear form and consider the related structure with vectors as points and isotropic lines.

There are three aspects we would like to stress on in our talk. First of all, there is an axiom system for affine polar spaces developed by Cohen and Shult. A slight difference appears between their and our approaches. Our definition does not exclude Minkowskian geometry for example. The other interesting thing is whether it is possible to recover the underlying affine polar space form a Grassmann structure over it. We give a positive answer to this question. And finally the third thing is when we take a symplectic instead of symmetric form. In this case an interesting geometry comes out which we try to generalize and that way so called affine semipolar spaces are brought into existence. We are going to shed some light on that geometry and its generalization.