Section 03: Algebraic and Analytic Geometry | Poster number 372

**Irregular subsets of the Grassmannian manifolds and symplectic geometry**

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**ABSTRACT**

Denote by $\mathbb{G}_k^n$ the Grassmannian manifold of $k$-dimensional planes in the Euclidean space $\mathbb{R}^n$. A set $R \subset \mathbb{G}_k^n$ is called *regular* if there exists a coordinate system for $\mathbb{R}^n$ such that any plane belonging to $R$ is a coordinate plane for this system; in other words there exists $n$ linearly independent lines such that any plane belonging to $R$ is generated by $k$ lines from this collection. Any coordinate system for $\mathbb{R}^n$ contains $c_k^n = \frac{n!}{k!(n-k)!}$ distinct $k$-dimensional coordinate planes. This implies that any regular subset of $\mathbb{G}_k^n$ contains not greater than $c_k^n$ elements.

We say that a regular set $R \subset \mathbb{G}_k^n$ is *maximal* if any regular subset of $\mathbb{G}_k^n$ containing $R$ coincides with $R$. It is not difficult to see that a regular subset of $\mathbb{G}_k^n$ is maximal if and only if it contains $c_k^n$ elements.]

A set $V \subset \mathbb{G}_k^n$ is called *irregular* if it is not regular and does not contain maximal regular sets.

Irregular subsets of the Grassmannian manifolds were studied in the author's papers [1, 2]. Now we consider one class of irregular subsets of $\mathbb{G}_k^n$. There is a natural one-to-one correspondence between elements of this class and symplectic structures on $\mathbb{R}^n$.

# References

[1] *Pankov M. A.* Irregular subsets of the Grassmannian manifold $\mathbb{G}_k^n$ and projections of $k$-dimensional subsets of $\mathbb{R}^n$ onto $k$-dimensional planes. Topology and Its Applications (101) 2, p.121–135, 2000.

[2] *Pankov M. A.* Irregular subsets of the Grassmannian manifolds. e-print math.AT/9910081.

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