Colloquial talk - Wednesday, **November 2, lecture hall M1, 5 pm**

Nikolay Scherbina

Title: On the integrability of nonsmooth distributions

Abstract:
The existence and uniqueness of integral curves for distributions of lines in ${mathbb R}^n$ is a classical result which was proved in 1894 by Picard and Lindel{"o}f for the case of distributions with Lip - regularity (in the modern literature this result is usually called "the existence and uniqueness theorem for ODE"). If the distribution is not Lip - regular, but just continuous, then the existence of integral curves was proved in 1890 by Peano, but these curves are not unique in general.

A similar problem of the existence and uniqueness of integral surfaces for distributions of dimension $k > 1$ is more involved and the corresponding result is usually attributed to the work of Frobenius from 1877 (some earlier results on this problem were also obtained by Clebsch in 1866 and Deahna in 1840). The integral surfaces for distributions of dimension larger than 1 do not exist in general even for smooth distributions and the condition which guarantees the existence and uniqueness of such surfaces is given in terms of the Lie brackets of the vector fields generating the given distribution.

In our talk we present a "Peano version" of the Frobenius result, more precisely, we give a geometric necessary and sufficient condition for the existence of integral surfaces for distributions of hyperplanes which are just continuous. The corresponding problem for distributions of higher codimension is still completely open.

Nikolay Scherbina is a Full Professor at the University of Wuppertal (Germany). His main field of research in Complex Analysis in Several Variables, with strong interactions with Potential Theory and Topology. He has several distinguished results in the field, mainly in the framework of the Pluripotential Theory, published in top math journals, including Acta Mathematica and Duke Math Journal.