MEAN-VALUE HARMONIC FUNCTIONS

TOMASZ ADAMOWICZ

Abstract. In the talk we introduce and study strongly and weakly harmonic functions on metric measure spaces defined via the mean value property holding for all and, respectively, for some radii of balls at every point of the underlying domain. We explain the historical background, relations of the harmonicity to stochastic games and discuss some of the properties of strongly and weakly harmonic functions including Harnack estimates, maximum and comparison principles, the Hölder and the Lipshitz estimates and some differentiability properties. Moreover, we will discuss the mean value-harmonic functions in the setting of the Carnot–Carathéodory groups, focusing on regularity and relations of such functions to the sub-Laplace equation.

The talk is based on joint works with Gaczkowski, Gorka and Warhurst.

IMPAN Warsaw

THEORY OF P-HARMONIC MAPPINGS: PROGRESS AND OPEN PROBLEMS

CHANGYU GUO

Abstract. In this talk, we mainly discuss the theory of minimizing p-harmonic mappings between Riemannian manifolds and possible connections with H-systems. The first part of the talk is focus on the theory of p-harmonic mappings. In particular, we will give an overview of the development on harmonic mappings between Riemannian manifolds and then discuss the regularity, quantitative gradient estimates and Liouville type theorems for both harmonic and p-harmonic mappings. Then we turn to discuss the theory of harmonic mappings between singular metric spaces. In particular, we briefly recall the theory of Korevaar-Schoen Sobolev spaces for metric space valued mappings and the associated energy functional. We will introduce the work of Gromov and Schoen 1992, Korevaar and Schoen 1993 and some more recent works along this direction. If time permits, some connections with the H-systems would be discussed as well.

University of Fribourg

THE BELTRAMI DIFFERENTIAL REVISITED

THOMAS METTLER

Abstract. The Beltrami differential is a fundamental object in the study of quasiconformal mappings. It is a relative object in the sense that it describes a complex structure relative to a given one. One might wonder whether there exists a notion of an "absolute" Beltrami differential which does not require the presence of an initial complex structure. In my talk I will explain that this is indeed the case and discuss a resulting non-linear cousin to the Beltrami equation and its significance in 2D projective geometry. Joint with G. Paternain

Goethe-Universität Frankfurt

GEOMETRIC AND FUNCTIONAL INEQUALITIES VIA A 1-DIMENSIONAL LOCALISATION METHOD

ANDREA MONDINO

Abstract. In the talk I will review the localization method from its roots in the 50'ies by Payne-Weinberger, to the L^1 approach in smooth Riemannian manifolds by Klartag, to the work in collaboration with Cavalletti in metric measure spaces. The second part of the talk will be devoted to the proof of the Levy-Gromov inequality in metric measure spaces with Ricci curvature bounded below obtained via such a technique in a joint work with Cavalletti.

University of Warwick

HARMONIC QUASI-ISOMETRIC MAPS INTO GROMOV HYPERBOLIC CAT(0)-SPACES

HUBERT SIDLER

Abstract. The Schoen-Li-Wang conjecture asserts that for every quasi-isometric map between rank-one symmetric spaces there is a unique energy minimizing harmonic map within bounded distance. Several breakthroughs by Markovic, Lemm-Markovic and Benoist-Hulin finally led to an affirmative answer to this conjecture. Later Benoist-Hulin generalized the existing results to the case of Hadamard manifolds with negatively pinched curvature.

In this talk, I will first briefly recall the above results, and the notion of Korevaar-Schoen energy. Then, I will discuss a generalization of the existence results of Benoist-Hulin where the target is a Gromov hyperbolic, locally-compact, CAT(0)-space. This is a joint work with Stefan Wenger.

University of Fribourg

FUNCTIONS OF BOUNDED FRACTIONAL VARIATION AND FRACTAL CURRENTS

ROGER ZÜST

Abstract. In this talk we introduce a notion of functions of bounded fractional variation, where the sup-norm of test functions as used in the classical definition is replaced by the Hoelder norm with respect to some exponent. Particular examples that belong to this class are Hoelder functions and characteristic functions of domains with fractal bounderies. Among a characterization in terms of currents, we state some properties that naturally extend those of classical functions of bounded variation such as compactness and higher integrability.

University of Bern