MON/E3.1
17:00–17:20

Rank-one convexity and Ornstein's L^1-noninequalities

*Bernd Kirchheim** (Univ. Düsseldorf), *Jan Kristensen* (Univ. Oxford)

The fact that linear differential operators which are linearly independent can still have for every 'test function' images of comparable norms in the L^2-sense (or more generally, in L^p for $p \in (1,\infty)$) is one of the central tools when dealing with PDEs and questions from harmonic analysis.

On the other hand, in the sixties D. Ornstein introduced a very involved construction (see [3]) to show that such a phenomenon can never occur in the L^1-context. This result was later used to prove the nonsolvability of several basic PDEs, see [1–2]. But on the other hand it still seems not to have the popularity it deserves.

We show how Ornstein's result naturally fits in the general framework of convex integration and that it can be extended to certain nonlinear settings. Our main tool is a newly established property of one-homogeneous rank-one convex functions. Further applications in the theory of relaxation and Gradient Young measures are discussed as well.

[1] J. BOURGAIN, H. BREZIS: On the equation div$Y = f$ and application to control of phases. *J. Amer. Math. Soc.* **16**/2 (2003), 393–426.

[2] C. T. MCMULLEN: Lipschitz maps and nets in Euclidean space. *Geom. Funct. Anal.* **8** (1998), 304–314.

[3] D. ORNSTEIN: A non-inequality for differential operators in the L_1 norm.. *Arch. Rational Mech. Anal.* **11** (1962), 40–49.