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Nonlocal quadratic forms, regularity theory and kinetic equations

Abstract

We report on recent developments in the study of nonlocal operators. The central object of the talk are quadratic forms similar to those that define Sobolev spaces of fractional order. These objects are naturally linked to Markov processes via the theory of Dirichlet forms. We provide regularity results for solutions to corresponding integrodifferential equations. Our emphasis is on forms with singular and anisotropic measures. Some of the objects under consideration are related to the Boltzmann equation, which leads to an interesting question of comparability of quadratic forms. The talk is based on recent results joint with B. Dyda and with K.-U. Bux and T. Schulze.