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Nonlocal theory for fractional kinetic equations

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Abstract:

We extend the De Giorgi-Nash-Moser theory to a class of nonlocal hypoelliptic equations naturally arising in kinetic theory, which combine a first-order skew-symmetric operator with an elliptic operator involving fractional derivatives along only part of the coordinates. Under sufficient integrability along the transport variables on the nonlocal tail, we prove the first local L^∞ estimate for this class of equations. Then, we establish the first full Harnack inequality for solutions to kinetic integral equations under the aforementioned tail summability assumption, which appears in clear accordance with the very recent counterexample by Kassmann and Weidner *Adv. in Math.* (2024). This is based on series of papaers by F. Anceschi, M. Kassmann, A. Loher, G. Palatucci, M. Weidner and myself.

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