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Fractional Regularity for Nonlinear Elliptic Problems with Measure Data

We consider nonlinear elliptic equations of the type

$$-\operatorname{div} a(x, Du) = \mu$$

having a Radon measure on the right-hand side and prove fractional differentiability results of Calderón-Zygmund type for very weak solutions. We extend some of the results achieved by G. Mingione [“The Calderón-Zygmund theory for elliptic problems with measure data”, Ann. Sc. Norm. Super. Pisa Cl. Sci. (5), 6 (2007) 195–261], in turn improving a regularity result by G. R. Cirmi and S. Leonardi [“Higher differentiability for solutions of linear elliptic systems with measure data”, Discrete Contin. Dyn. Syst. 26 (2010) 89–104].

Keywords: Nonlinear elliptic problems, Calderon-Zygmund theory, Measure data, Fractional differentiability, Fractional Sobolev spaces.

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