

Asymptotically regular problems II: Partial Lipschitz continuity and a singular set of positive measure

CHRISTOPH SCHEVEN AND THOMAS SCHMIDT

Abstract. We consider multidimensional variational integrals for vector-valued functions $u : \mathbb{R}^n \supset \Omega \rightarrow \mathbb{R}^N$. Assuming that the integrand satisfies the standard smoothness, convexity and growth assumptions **only near** ∞ we investigate the partial regularity of minimizers (and generalized minimizers) u . Introducing the open set

$$R(u) := \{x \in \Omega : u \text{ is Lipschitz near } x\},$$

we prove that $R(u)$ is dense in Ω , but we demonstrate for $n \geq 3$ by an example that $\Omega \setminus R(u)$ may have positive measure. In contrast, for $n = 2$ one has $R(u) = \Omega$.

Additionally, we establish analogous results for weak solutions of quasilinear elliptic systems.

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