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Kauhanen, Janne
Failure of the condition N below $W^{1,n}$. (English) Zbl 1027.26015
Ann. Acad. Sci. Fenn., Math. 27, No. 1, 141-150 (2002).

The Lusin condition N says that given a continuous mapping f from a bounded subset Ω of $\mathbb{R}^n$ into $\mathbb{R}^n$, $n \geq 2$, then f maps every subset of Ω of zero measure to a set of zero measure. The well-known result by *M. Marcus* and *V. Mizel* [Bull. Am. Math. Soc. 79, 790-795 (1973; Zbl 0275.49041)] states that $f \in W^{1,1}(\Omega, \mathbb{R}^n)$ satisfies the condition N under the assumption $|Df| \in L^p(\Omega)$ for some $p > n$. The condition N may fail if this assumption holds only for $p \leq n$ and then there is a question about the size of an exceptional set, i.e., the set outside of which the condition holds. *J. Malý* and *O. Martio* [J. Reine Angew. Math. 458, 19-36 (1995; Zbl 0812.30007)] proved that for $f \in W^{1,n}(\Omega, \mathbb{R}^n)$ exceptional sets have the Hausdorff dimension zero.

The author deals with the case below $W^{1,n}(\Omega, \mathbb{R}^n)$. He proves that for $Q_0 = [0,1]^n$ and $f \in W^{1,1}(Q_0, \mathbb{R}^n)$ such that $\sup\limits_{0<\varepsilon\leq n-1} \varepsilon \int_{Q_0} |Df(x)|^{n-\varepsilon} dx < \infty$ one cannot, in general, find an exceptional set of Hausdorff dimension smaller than n.

Reviewer: Jiří Rákosník (Praha)

MSC:

26B35 Special properties of functions of several variables, Hölder conditions, etc.
74B20 Nonlinear elasticity
46E35 Sobolev spaces and other spaces of "smooth" functions, embedding theorems, trace theorems

Cited in **4** Documents

Keywords:

Lusin condition; Hausdorff dimension; exceptional set

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