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Abstracts of Short Communications and Posters

Section:

8. Analysis

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On open and discrete mappings of Sobolev classes with integrable dilatation

In connection with problems in nonlinear elasticity it has become important to study analytical conditions on the mapping $f : \Omega \to \mathbb{R}^n$, $\Omega \subset \mathbb{R}^n$, $n \geq 2$, that will imply topological properties of f.

Theorem. *Every nonconstant continuous mapping in the Sobolev space $W_1^1(\Omega; \mathbb{R}^n)$ with nonnegative and summable Jacobian $J(x, f) = \det Df(x)$ and quasi-light of finite dilatation $K(x) = |Df(x)|^n/J(x, f) \in L_p$ for some $n-1 \leq p \leq \infty$ at $n = 2$ and $n-1 < p \leq \infty$ at $n \geq 3$, is discrete open differentiable a. e., and belongs to $W_q^1(\Omega)$ where $q = np/(p+1)$.*

The result is connected both with the theory of mappings with bounded distortion (Yu. G. Reshetnyak) and with some theorems in papers of J. M. Ball, V. Sverák, T. Iwaniec, S. Müller, Qi. Tang, B. S. Yan, J. Heinonen, P. Koskela, J. Manfredi and E. Villamor.