



Volume 1, Issue 2, Article 14

Regularity results for vector fields of bounded distortion and applications

Authors: [Alberto Fiorenza](#), [Flavia Giannetti](#),

Keywords: Reverse Inequalities, Finite Distortion Vector Fields, Div-Curl Vector Fields, Elliptic Partial Differential Equations

Date Received: 17/01/00

Date Accepted: 04/04/00

Subject Codes: 35J60,26D15.

Editors: [Saburou Saitoh](#),

Abstract:

In this paper we prove higher integrability results for vector fields B, E ,

$(B, E) \in L^{2-\varepsilon}(\Omega, \mathbb{R}^n) \times L^{2-\varepsilon}(\Omega, \mathbb{R}^n)$, ε small, such that

$\operatorname{div} B = 0$, $\operatorname{curl} E = 0$ satisfying a "reverse" inequality of the type

$$|B|^2 + |E|^2 \leq \left(K + \frac{1}{K} \right) \langle B, E \rangle + |F|^2$$

with $K \geq 1$ and $F \in L^r(\Omega, \mathbb{R}^n)$, $r > 2 - \varepsilon$. Applications to the

theory of quasiconformal mappings and partial differential equations are given. In particular, we prove regularity results for very weak solutions of equations of the type

$$\operatorname{div} a(x, \nabla u) = \operatorname{div} F.$$

if $|a(x, z)|^2 + |z|^2 \leq (K + 1/K) \langle a(x, z), z \rangle$, in the

homogeneous case, our method provides a new proof of the regularity result

$$u \in W_{loc}^{1,2-\varepsilon}(\Omega) \Rightarrow u \in W_{loc}^{1,2+\varepsilon}(\Omega)$$

where ε is sufficiently small. A result of higher integrability for functions verifying a reverse integral inequality is used, and its optimality is proved.



[Download Screen PDF](#)



[Download Print PDF](#)



[Send this article to a friend](#)



[Print this page](#)

[search](#)

[\[advanced search\]](#)

[copyright 2003](#)

[terms and conditions](#)

[login](#)