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Quasiconformal mappings onto John domains. (English) Zbl 0712.30017

Rev. Mat. Iberoam. 5, No. 3-4, 97-123 (1989).

Suppose that f is a quasiconformal map of the unit ball $\mathbb{B}^n$ onto a domain D in $\mathbb{R}^n$. Then the first main theorem of this paper provides nine equivalent conditions for D to be a John domain. The conditions involve either the geometry of D or the behavior of f. Similar results in the plane for conformal maps were obtained by *Ch. Pommerenke* [J. Lond. Math. Soc. 26, 77-88 (1982; Zbl 0464.30012)]; see also *R. Näkki* and *J. Väisälä* [Exp. Math. 9, 3-43 (1991)]. The second main theorem extends a subinvariance result of *J. Väisälä* [Acta Math. 162, No.3, 201-225 (1989; Zbl 0674.30017)], and it describes how a quasiconformal mapping behaves in nice subdomains. This quite general theorem contains as a special case e.g. the fact that if f is a quasiconformal map of a domain D onto the unit ball $\mathbb{B}^n$, then the image of every ball $B \subset D$ is a uniform domain in $\mathbb{B}^n$; this result was effectively used for plane conformal maps f in establishing the $(1+\epsilon)$-integrability of f' on lines [*J. L. Fernández*, *J.Heinonen* and *O. Martio*, J. Anal. Math. 52, 117-132 (1989; Zbl 0677.30012)].

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