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Summary: We prove that if the minors of degree $k$ of a Sobolev map $\mathbb{R}^d \to \mathbb{R}^d$ are smooth then the map is smooth, when $k, d$ are not both even. We use this result to derive a simple, self-contained proof of the famous Liouville theorem for conformal maps, under the weakest possible regularity assumptions, in even dimensions which are not multiple of 4. This is based on the approach taken in [Acta Math. 170, No. 1, 29–81 (1993; Zbl 0785.30008)] by T. Iwaniec and G. Martin. We also prove the regularity of $W^{1,d/2}$ conformal maps between Riemannian manifolds, under the additional assumption of continuity.

MSC:
30C65 Quasiconformal mappings in $\mathbb{R}^n$, other generalizations

Keywords:
conformal maps; quasiconformal maps; quasiregular maps

Software:
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