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On a conjecture of De Giorgi and some related problems. (English) Zbl 0918.35046
Math. Ann. 311, No. 3, 481-491 (1998).

The authors show some new contributions to a conjecture of *E. De Giorgi* [Proc. Int. Meeting on Recent Methods in Nonlinear Analysis, Rome, 1978, 131-188 (1979; [Zbl 0405.49001](#))], related to the level sets of some entire solutions of the nonlinear partial differential equation $\Delta u + u - u^3 = 0$ in \mathbb{R}^n . In fact, a stronger version of this conjecture is proved to be true in dimension 2, while the conjecture also holds in dimension 3 assuming some additional restrictions on the asymptotic behaviour of the solution. Moreover, some counterexamples are given, in dimensions greater than or equal to 7, and to other conjectures, which are related to the De Giorgi's one, formulated by *H. Berestycki*, *L. Caffarelli* and *L. Nirenberg* [Further qualitative properties for elliptic equations in unbounded domains, Preprint, 1997]. The Ekeland's variational principle is used in the proofs.

Reviewer: [Antonio Cañada \(Granada\)](#)

MSC:

[35J60](#) Nonlinear elliptic equations
[35B40](#) Asymptotic behavior of solutions to PDEs
[35B45](#) A priori estimates in context of PDEs

Cited in **6** Reviews
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Keywords:

[De Giorgi's conjecture](#); [level sets](#); [variational principles](#)

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