The local minimum theorem: complements and applications

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The existence of at least two or three non-zero solutions for nonlinear elliptic eigenvalue problems is established. The basic ingredients are the local minimum theorem obtained in [1] and the classical Ambrosetti-Rabinowitz theorem. Some remarks on the mountain pass theorem and its relationships with the local minima are highlighted; further, a note on parameters for which the above problems admit solutions is done as well as a qualitative property of the obtained local minimum is investigated. By an appropriate combination of previous results, theorems of two and three critical points are obtained and a variant of the three critical points theorem, where the classical compactness condition of Palais-Smale is not assumed, is also emphasized.

References

[1] G. Bonanno, *A critical point theorem via the Ekeland variational principle,* Nonlinear Anal. 75 (2012), 2992-3007.