

Mercuri, Francesco; Palmieri, Giuliana

Morse theory with low differentiability. (English) Zbl 0633.58014
Boll. Unione Mat. Ital., VII. Ser., B 1, 621-631 (1987).

The authors generalize the Morse lemma to functions of class \mathcal{C}^1 , which are required to be twice differentiable only at the critical points. This result is applied to show that every simply connected compact Finsler manifold \mathcal{M} possesses infinitely many (geometrically distinct) nonconstant closed geodesics, provided that all closed geodesics are nondegenerate and that the Betti numbers b_k of the space $\Lambda \mathcal{M}$ of free loops are not bounded as $k \rightarrow \infty$. The same result was proved by *H. H. Matthias* [Bonn. Math. Schr. 126 (1980; Zbl 0481.53042)], by a different technique (finite-dimensional approximation of the space $\Lambda \mathcal{M}$).

Reviewer: [M. Degiovanni](#)

MSC:

- [58E10](#) Variational problems in applications to the theory of geodesics (problems in one independent variable)
- [53C22](#) Geodesics in global differential geometry
- [53C60](#) Global differential geometry of Finsler spaces and generalizations (areal metrics)

Cited in **2** Reviews
Cited in **6** Documents

Keywords:

[closed geodesics](#); [Morse lemma](#); [Finsler manifold](#)