

VOLUME PRESERVING DIFFEOMORPHISMS WITH WEAK AND LIMIT WEAK SHADOWING

Manseob Lee

Department of Mathematics
Mokwon University, Daejeon, 302-729, Korea

Abstract. Let f be a volume-preserving diffeomorphism of a closed C^∞ two-dimensional Riemannian manifold M . In this paper, we prove that the followings are equivalent:

- (a) f belongs to the C^1 -interior of the set of volume-preserving diffeomorphisms satisfying the weak shadowing property,
- (b) f belongs to the C^1 -interior of the set of volume-preserving diffeomorphisms satisfying the limit weak shadowing property
- (c) f is Anosov.

Keywords. Shadowing, lweak shadowing, limit weak shadowing, hyperbolic, Anosov, volume-preserving.

AMS (MOS) subject classification: 34D30, 37C20.

References

- [1] A. Arbieto and T. Catalan, *Hyperbolicity in the volume preserving scenario*, to appear in Ergodic Th. & Dynam. Syst.
- [2] C. Bonatti, L. J. Díaz and E. R. Pujals, *A C^1 -generic dichotomy for diffeomorphisms: weak forms of hyperbolicity or infinitely many sinks or sources*, Ann. of Math., **158**(2003), 355-418.
- [3] S. Hayashi, *Diffeomorphisms in $\mathcal{F}^1(M)$ satisfy Axiom A*, Ergodic Theory & Dynam. Syst., **12** (1992), 233-253.
- [4] M. Hirsh, C. Pugh and M. Shub, *Invariant manifolds*, Lecture Notes in Math. Springer-Verlag (1977).
- [5] R. Mañé, *A proof of the C^1 -stability conjecture*. Publ. Math. de IHES, **66**(1987), 161-210.
- [6] J. Moser, *On the volume elements on a manifold*, Trans. Amer. Math. Soc., **120**(1965), 286-294.
- [7] J. Palis, *On the C^1 - Ω -stability conjecture*, Inst. Hautes études Sci. Publ. Math., **66**(1988), 211-215.
- [8] O. Plamenevskaya, *Weks shadowing for two-dimensional diffeomorphisms*, Vestnik St. Petersburg Univ. Math., **31**(1998), 49-56.
- [9] S. Pilyugin, "Shadowing in Dynamical Systems", Lecture Notes in Math. Springer-Verlag, **1706**(1999).
- [10] S. Pilyugin, K. Sakai and O. Tarakanov, *Transversality properties and C^1 -open sets of diffeomorphisms with weak shadowing*, Discrete and Contin. Dynam. Syst., **16**(2006), 871-882.
- [11] K. Sakai, *Diffeomorphisms with weak shadowing*, Fund. Math., **11**(2001), 53-75.
- [12] K. Sakai, *A Note on weak shadowing*, Far East J. Dynam. Syst., **3**(2001), 45-49.
- [13] K. Sakai, *Diffeomorphisms with limit weak shadowing*, Trends in Math., **7**(2004), 19-27.
- [14] K. Sakai, and O. Tarakanov, *Limit weak shadowing property*, Far East J. Dynam. Syst., **7**(2005), 105-173.

Received March 2012; revised April 2013.

<http://monotone.uwaterloo.ca/~journal/>