Seminario de Geometría y Topología

UNIVERSIDAD COMPLUTENSE MADRID

Shadowing and inverse shadowing in group actions

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Abstract:

Let f be a homeomorphism of a metric space (M, dist). Fix a d > 0. A sequence ξ = {x k ∈ M : pseudotrajectory of f if

$$\text{dist}(x_{k+1}, f(x_k)) < d, \quad k \in Z\}$$

is called a d-k ∈ Z.

The homeomorphism f has shadowing property if for any ε > 0 there exists a d > 0 such that for any d-pseudotrajectory ξ = {x k } there is a point x ∈ M such that

$$\text{dist}(x_k, f^k(x)) < \varepsilon, \quad k \in Z.$$

Thus, the shadowing property means that every approximate trajectory of f is close to an exact trajectory.

A sequence Φ of continuous mappings φ k : M → M is called a d-method for f if φ 0 = Id and

$$\text{dist}(\varphi_{k+1}(p), f(\varphi_k(p))) < d, \quad k \in Z, p \in M.$$

The homeomorphism f has inverse shadowing property if for any ε > 0 there exists a d > 0 such that for any point x ∈ M and any d-method Φ = {φ k } there is a point p ∈ M such that

$$\text{dist}(\varphi_k(p), f^k(x)) < \varepsilon, \quad k \in Z.$$

Thus, the inverse shadowing property means that, for any "method" pro-ducing approximate trajectories of f and for every exact trajectory of f, there is an approximate trajectory produced by this method that is close to the chosen exact trajectory.

The theory of shadowing and inverse shadowing for dynamical systems generated by homeomorphisms (i.e., for actions of the group Z) is now well developed.

In this talk, we discuss similar problems for actions of some more general finitely generated groups.

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