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Studies on almost periodic minimal sets an overview

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Abstract
This Paper we characterize the finite dimensional almost periodic minimal sets; this is accomplished by regarding them as certain topological groups and then characterizing these groups. Once this conditions under which it must be a torus. These results generalize those of.

Keywords: Periodic, minimal, finite dimensional

Introduction

Throughout this paper, all spaces considered will be separable. metric. By the dimension of a space we shall mean the covering dimension [7; p. 89], which for separable metric) space every point spaces is the same as inductive dimension [1].

The term n-manifold will mean a (separable metric) space every point of which has a neighborhood homeomorphic to Euclidean n-space R and the terms manifold-with boundary and submanifold have their usual meanings. Where we consider differentiable menifolds, smooth means at least C'. For detailed development of these notions and for a treatment of smooth flows we cite [2].

Suppose X is a manifold. We call X regular (by analogy with a regular topological space) if given any compact set A in X and a neighborhood U of A, there is a compact submanifold-with boundary Y which is a neighborhood of A and lies in U. Whether every topological manifold is regular we do not know; one can show every smooth manifold and every piecewise linear manifold is regular.

In several results we use a simple result from algebra which, for convenience, we state in this section. Let Q denote the additive group of rational numbers. Suppose B is a subgroup of Q; either B is generated by one element or it is infinitely generated in which case every element of B is divisible in B by arbitrarily large integers. Using this fact it is easy to prove the following.

Algebraic Lemma. Let A → B → C be an exact sequence of Abelian group where A is finitely genereated B is a subgrout (and hence isomorphic either to Z or to 0).

Main result:- We now assert and prove the following two Theorems for the characterization of an almost periodic minimal set by equicontinuity of the motion.

Theorem:- Let E be an almost periodic minimal set for a flow on a compact space X, then every point Y ∈ E is an almost periodic point.

Proof:- Let X be an almost periodic point such that E=H(x). Let Y E E be any arbitrary point. Then there exists a net {t_1} in R such that Y$\pi(x, t_1) \rightarrow y$. Then its characterization by normality due to Besicovitch.

We have a subnet of (ir(x, t1 + t)} that converges uniformly and by the continuity of π the limit must be $\pi(y, t)$. Since π (y, t) is the uniform limit of almost periodic function, it is almost periodic.

Theorem:- Let π be an equicontinuos. flow on a compact uniform space X. Then π is uniformly equicontinuous.

Proof:- Since it is equicontinuous flow on a compact uniform space X the family {π^t: t E R} is equicontinuos in C(XxX). Again since π^t is continuous it is uniformly continuous for a∈A. there exists be ∈A such that $\pi^t(y)$ ∈V_a ($\pi^t(x)$ if y ∈ $V_a(\pi^t(x)$ if y ∈ $V_b(x)$, where b does not depends x ∈ X rather on ∈ A. Hence π is uniformly equicontinuous on X.

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