POINCARE RECURRENCE THEOREM FOR FINITELY ADDITIVE MEASURES

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SUMMARY.- *In this paper we study the validity of Poincaré recurrence theorem for finitely additive measures.*

§ 1.- DEFINITIONS AND PROBLEM

Let X be an arbitrary non empty point set, and $T : X \to X$ a trasformation on X. If $(X,\mathcal{A},\mu)$ is a charge space, i.e. , $\mathcal{A}$ is a field of subsets of X and μ is a nonnegative charge (usually called finitely additive measure) the transformation T is called a measurable transformation if

(1.1) $$\forall A \in \mathcal{A} : T^{-1}(A) \in \mathcal{A}$$

A measurable trasformation T is said to be measure preserving if

(1.2) $$\forall A \in \mathcal{A} : \mu(T^{-1}(A)) = \mu(A).$$

If T is a measure preserving transformation and $E \in \mathcal{A}$ then a point $x \in E$ is called recurrent if

$$\exists\, n \in \mathbb{N}^{(2)} \text{ such that } T^n x \in E$$

and x is called strongly recurrent if

$$T^n x \in E \qquad \text{for infinitely many values of } n.$$

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(2) $\mathbb{N}$ is the set $\{1,2,3,\dots\}$ of positive integers, $\mathbb{N}_0 = \{0,1,2,\dots\}$ and $\mathbb{Z} = \{\dots -2,-1,0,1,2,\dots\}$