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In 1970s Furstenberg observed that there are tight connections between recurrence in dynamics and properties of sets of integers. A classical application of this approach is Multiple Recurrence Theorem which can be used to provide "dynamical" proof of van der Waerden theorem, and at the same time can be derived from this theorem (in this sense both theorems are equivalent).

We say that a point $x \in X$ is *multi-recurrent* if it satisfies the conclusion of the topological multiple recurrence theorem, that is for any $d \in \mathbb{N}$ there is a strictly increasing sequence $\{n_k\}_{k=1}^{\infty}$ in \mathbb{N} with $T^{in_k}x \rightarrow x$ as $k \rightarrow \infty$ for every $i = 1, 2, \dots, d$.

In this talk we will characterize some properties of multi-recurrent points and their relations to families of sets of integers. Among other things, it leads to another proof on the existence of a C-set with zero Banach density. (Received January 19, 2015)