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On the hereditarily hypercyclic operators. (English) Zbl 1114.47008

J. Korean Math. Soc. 43, No. 6, 1219-1229 (2006).

A linear and continuous operator $T : X \to X$ on a separable Banach space X is said to be hypercyclic whenever there exists a vector $x \in X$ with dense orbit $\{T^n x : \ n \geq 0\}$ in X. Given an increasing sequence (n_k) of positive integers, T is said to be hereditarily hypercyclic (HHC) with respect to (n_k) if (T^{m_k}) is hypercyclic for every subsequence (m_k) of (n_k).

The paper under review deals mainly with this special case of hypercyclicity. In particular, it is proved that a linear continuous operator T is HHC with respect to (n_k) if and only if given two non-void open subsets U, V of X, $T^{n_k}(U) \cap V \neq \varnothing$ for any k large enough; and if T is HHC with respect to a syndetic sequence (n_k) (that is, $\sup_k (n_{k+1} - n_k) < \infty$), then it is HHC with respect to the whole sequence. In addition, applications to the bilateral backward shift operator on the space $L^p(\beta)$ are given.

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MSC:

47A16 Cyclic vectors, hypercyclic and chaotic operators
47L10 Algebras of operators on Banach spaces and other topological linear spaces

Keywords:
hereditary hypercyclicity; hypercyclicity criterion; bilateral backward shift

Full Text: DOI