∞-Tuples of operators and Hereditarily

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Abstract

In this paper, we introduce for an ∞-tuple of operators on common Ordered Banach space and some conditions to an ∞-tuple to be Hereditary Hypercyclic infinity tuple. The supreme is taken over norm operator defined on the space.

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1 Introduction

Let $\mathcal{X}$ be an infinite dimensional Banach space and $T_1, T_2, ...$ are commutative bounded linear operators on $\mathcal{X}$. By an ∞-tuple we mean the ∞-component $\mathcal{T} = (T_1, T_2, ...)$. For the ∞-tuple $\mathcal{T} = (T_1, T_2, ...)$ the set

$$\mathcal{F} = \bigcup_{n=1}^{\infty} \{{T_1}^{k_1}{T_2}^{k_2}...{T_n}^{k_n} : k_i \geq 0, i = 1, 2, ..., n, n \in \mathcal{N}\}$$

is the semigroup generated by $\mathcal{T}$. For $x \in \mathcal{X}$ take

$$Orb(\mathcal{T}, x) = \{Sx : S \in \mathcal{F}\}.$$

In other hand

$$Orb(\mathcal{T}, x) = \bigcup_{n=1}^{\infty} \{{T_1}^{k_1}{T_2}^{k_2}...{T_n}^{k_n}(x) : k_i \geq 0, i = 1, 2, ...n\}.$$

Definition 1.1 *The set $Orb(\mathcal{T}, x)$ is called, orbit of vector x under $\mathcal{T}$ and ∞-Tuple $\mathcal{T} = (T_1, T_2, ...)$ is called hypercyclic ∞-tuple, if there is a vector $x \in \mathcal{X}$ such that, the set $Orb(\mathcal{T}, x)$ is dense in $\mathcal{X}$, that is*

$$\overline{Orb(\mathcal{T}, x)} = \overline{\bigcup_{n=1}^{\infty} \{{T_1}^{k_1}{T_2}^{k_2}...{T_n}^{k_n}(x) : k_i \geq 0, i = 1, 2, ...n\}} = \mathcal{X}.$$

In this case, the vector x is called a hypercyclic vector for the ∞-tuple $\mathcal{T}$.

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