On distributionally irregular vectors

VLADIMIR MÜLLER

Mathematical Institute
Czech Academy of Sciences (Czech republic)
`muller@math.cas.cz`

Let T be a bounded linear operator acting on a Banach space X. A vector $x \in X$ is called irregular if $\sup \|T^n x\| = \infty$ and $\inf \|T^n x\| = 0$. The notion was introduced by Beauzamy and is closely connected with hypercyclicity of vectors.

We consider a related notion of distributionally irregular vectors. A vector $x \in X$ is called distributionally irregular if there exist subsets A, B of natural numbers with upper density 1 such that $\lim_{n \in A} \|T^n x\| = \infty$ and $\lim_{n \in B} \|T^n x\| = 0$. Both irregular and distributionally irregular vectors were studied in the context of dynamical systems (under the names of Li-Yorke chaos and distributional chaos, respectively).

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