

LINEAR DYNAMICS: AN ANALYSIS OF THE BEHAVIOR OF COMPOSITION OPERATORS ON L^p SPACES

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Linear Dynamics is an area of mathematics, lying in the intersection of Operator Theory and Dynamical Systems and consisting in the study of the behavior of the iterates of linear operators. It has received a lot of attention in the last decades and a flurry of intriguing results have been produced.

A meaningful, under the dynamical point of view, class of operators, is that of Composition Operators, $T_f : \varphi \rightarrow \varphi \circ f$, where it is the nature of the transformation f to determine the dynamics.

In the talk, in the setting of separable Banach spaces, I will briefly recall some fundamentals of Linear Dynamics, like hypercyclicity, mixing, Devaney and Li-Yorke chaos, frequent hypercyclicity, generalized hyperbolicity, expansivity and shadowing. These properties are completely characterized for a significant class of operators, the *weighted shifts*, and they have also been recently investigated for composition operators on L^p spaces, because of their versatility in applications to several research areas.

In the first part of the talk, after an excursion on the state of the art of these topics, I will focus on a large natural class of composition operators: I will prove that the notions of generalized hyperbolicity and shadowing coincide for such class, and I will also describe computational tools which allow the construction of operators with and without the shadowing property.

In the second part of the talk, I will show a general technique which allows to lift up the characterizations given for weighted backward shifts to a broader class of operators on L^p spaces, the *shift-like operators*, which naturally appear as composition operators on L^p when the underlying space is dissipative.

REFERENCES

- [1] E. D'ANIELLO, U. B. DARJI, AND M. MAIURIELLO, *Generalized hyperbolicity and shadowing in L^p spaces*, Journal of Differential Equations, 298, pp. 68–94, 2021
- [2] E. D'ANIELLO, U. B. DARJI, AND M. MAIURIELLO, *Shift-like Operators on L^p spaces*, <https://arxiv.org/abs/2107.12103>, 2021