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Koopman semigroups in functions and sequences Lebesgue spaces

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Composition operators in dynamic systems are often referred to as Koopman operators, in honor of the French-American mathematician Bernard Osgood Koopman (1900–1981). In this talk, we present a brief introduction to Koopman semigroups. Next, we present three examples of weighted Koopman semigroups defined on fractional Lebesgue-Sobolev spaces on the half real line.

We are also interested in connecting Koopman semigroups in Lebesgue spaces of functions $L^p(\mathbb{R}^+)$ and semigroups in Lebesgue spaces of sequences l^p for $1 \leq p < \infty$. To do this, we use a certain Poisson transformation $\mathcal{P}: L^p(\mathbb{R}^+) \rightarrow l^p$ and its adjoint \mathcal{P}^* , which allows us to transfer the properties of the semigroup from one space to another. Two Koopman semigroups in l^p are presented and related to the canonical Koopman semigroup in $L^p(\mathbb{R}^+)$.

In the last part of the talk, we introduce operators that extend Cesàro operators (called Chen-type integral operators) subordinate to these Koopman semigroups in $L^p(\mathbb{R}^+)$ and l^p .

The first results of this article are a joint work with Verónica Poblete, from the University of Chile, and are published in Monatshefte für Mathematik, 206, (2025). The second part of the talk contains results from a preprint available on the Arxiv platform.

*Seminar website: <https://msrn.sfedu.ru/sl>. The seminar uses Microsoft Teams online platform. Please send questions to ademp.seminar@gmail.com (Tatiana Andreeva, scientific secretary).

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