Hypercyclic and mixing composition operators on $\mathcal{O}_M(\mathbb{R})$

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Dynamical properties of composition and weighted composition operators on various spaces of functions were intensively studied over the past decades by many authors e.g. by Bés, Bonet, Domański, Grosse-Erdmann, Jordá, Mortini, Shapiro.

During the talk I will focus on hypercyclicity and the mixing property of composition operators acting on the space of slowly increasing smooth functions $\mathcal{O}_M(\mathbb{R})$ well-known from the distribution theory. Recall that $\mathcal{O}_M(\mathbb{R})$ is given by

$$\mathcal{O}_M(\mathbb{R}) = \cap_{m=1}^{\infty} \cup_{n=1}^{\infty} \mathcal{O}_n^m(\mathbb{R}),$$

where

$$\mathcal{O}_n^m(\mathbb{R}) := \left\{ f \in C^m(\mathbb{R}) : |f|_{m,n} := \sup_{x\in\mathbb{R}, 0\le j\le m} (1+|x|^2)^{-n} |f^{(j)}(x)| < \infty \right\}.$$

I will present a characterization of all mixing composition operators C_ψ on $\mathcal{O}_M(\mathbb{R})$. Moreover I will show that this property is closely related to the solvability in $\mathcal{O}_M(\mathbb{R})$ of the Abel's functional equation, i.e. the problem to find $H \in \mathcal{O}_M(\mathbb{R})$ for a given symbol $\psi \in \mathcal{O}_M(\mathbb{R})$ which satisfies the equation

$$H(\psi(x)) = H(x) + 1.$$

References

[1] T. Kalmes, A . Przestacki, HYPERCYCLIC AND MIXING COMPOSITION OPERATORS ON $\mathcal{O}_M(\mathbb{R})$, preprint

*This is joint work with Thomas Kalmes (Chemnitz University of Technology).