

Commutative subalgebras of the algebra of smooth operators

Tomasz Ciaś

Adam Mickiewicz University, Poland

tcias@amu.edu.pl

Session: 17. Functional Analysis: relations to Complex Analysis and PDE

The significance of the space s of rapidly decreasing sequences in the theory of nuclear Fréchet spaces cannot be overestimated. In fact, by the Kōmura-Kōmura theorem, a Fréchet space is nuclear if and only if it is isomorphic to some closed subspace of $s^{\mathbb{N}}$. Moreover, s is isomorphic as a Fréchet space to many classical spaces of smooth functions, for example it is isomorphic to the Schwartz space $\mathcal{S}(\mathbb{R})$ of smooth rapidly decreasing functions on the real line.

In this talk we deal with some noncommutative analogue of the algebra s , namely with the Fréchet $*$ -algebra $\mathcal{L}(s', s)$ of so-called smooth operators. We focus on classification and characterization of closed commutative $*$ -subalgebras of $\mathcal{L}(s', s)$. In particular, we show a surprising fact that a closed commutative $*$ -subalgebra of $\mathcal{L}(s', s)$ is isomorphic as a Fréchet $*$ -algebra to some closed $*$ -subalgebra of s if and only if it is isomorphic as a Fréchet space to some complemented subspace of s . Moreover, we provide an example of a closed commutative $*$ -subalgebra of $\mathcal{L}(s', s)$ which is not embedded isomorphically into s as a closed $*$ -subalgebra.