VARVARA SHEPELSKA, University of Saskatchewan

Norm-controlled inversion in weighted convolution algebras

Let $\mathcal{A} \subseteq \mathcal{B}$ be two Banach algebras with a common unit. If $\mathcal{A}$ is inverse-closed in $\mathcal{B}$ and there is a function $h : \mathbb{R}^+ \times \mathbb{R}^+ \to \mathbb{R}^+$ such that

$$\|a^{-1}\|_{\mathcal{A}} \leq h(\|a\|_{\mathcal{A}}, \|a^{-1}\|_{\mathcal{B}}),$$

we say that $\mathcal{A}$ *admits norm-controlled inversion in* $\mathcal{B}$. This notion was introduced by K. Gröchenig and A. Klotz who showed that if $\mathcal{B}$ is a C^*-algebra and $\mathcal{A}$ is a differential $*$-subalgebra of $\mathcal{B}$, then $\mathcal{A}$ admits norm-controlled inversion in $\mathcal{B}$.

In case $\mathcal{B} = C(X)$, norm-controlled inversion is closely related to the phenomenon of invisible spectrum studied by N. Nikolski. From his results it follows that $\ell^1(G)$ for a discrete abelian group G or the unitization $L^1(G) + \mathbb{C} \cdot e$ of the group algebra of a locally compact abelian non-discrete group G do not admit norm-controlled inversion in $C(\widehat{G})$. On the other hand, certain weighted group algebras $\ell^p(\mathbb{Z}, \omega)$ admit norm-controlled inversion in $C(\mathbb{T})$.

In this talk, we will present some results on norm-controlled inversion for non-commutative weighted group algebras. In particular, we will provide sufficient conditions on a weight ω for $\ell^p(G, \omega)$ to be a Banach algebra admitting a norm-controlled inversion in $C_r^*(G)$ and show how this can be applied to locally finite groups as well as finitely generated groups of polynomial or intermediate growth and a natural class of weights on them. In the non-discrete case, we will discuss the existence of norm-controlled inversion in $B(L^2(G))$ for some related convolution algebras.

This is a joint work with E. Samei.