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Some remarks on minimal norms

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Suppose $(\mathscr{D}, \Gamma, \alpha)$ is a C*-dynamical system where Γ is a discrete group and $\mathscr{D}$ is a unital abelian C*-algebra. Let $\mathscr{A}_0$ be the *-algebra of all finitely supported functions from Γ into $\mathscr{D}$ equipped with the usual adjoint and twisted convolution multiplication. In general there are many C*-norms on $\mathscr{A}_0$, and there is always a maximal one. Must there be a minimal C*-norm on $\mathscr{A}_0$? In general, the answer is no. (The case $\mathscr{D} = \mathbb{C}$ and $\Gamma = \mathbb{Z}$ gives an example with no minimal norm.) However, in some cases, there is a minimal C*-norm on $\mathscr{A}_0$, which is a consequence of Theorem A below, which I will discuss in the talk.

A regular MASA inclusion is a pair $(\mathscr{C}, \mathscr{D})$ of unital C*-algebras (with the same unit) where $\mathscr{D} \subseteq \mathscr{C}$ is a MASA and the set

$$\mathscr{N}(\mathscr{C}, \mathscr{D}) := \{v \in \mathscr{C} : v\mathscr{D}v^* \cup v^*\mathscr{D}v \subseteq \mathscr{D}\}$$

has dense span in $\mathscr{C}$.

Theorem A *Let $(\mathscr{C}, \mathscr{D})$ be a regular MASA inclusion and let $\mathscr{L}$ be the linear span of $\mathscr{N}(\mathscr{C}, \mathscr{D})$ ($\mathscr{L}$ is a *-algebra). Then there are unique minimal and maximal C*-norms on $\mathscr{L}$.*

Application B *Let $(\mathscr{D}, \Gamma, \alpha)$ be as above and suppose that the action of Γ on $\widehat{\mathscr{D}}$ arising from the action α is topologically free. Then the reduced crossed product norm is the unique minimal C*-norm on $\mathscr{A}_0$.*

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