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Amenable, abelian operator algebras

Suppose that $\mathcal{A}$ is a Banach algebra and that $\mathcal{M}$ is a Banach space which is also a bimodule over $\mathcal{A}$. If the action of $\mathcal{A}$ on $\mathcal{M}$ is continuous, then we say that $\mathcal{M}$ is a Banach bimodule over $\mathcal{A}$. For these bimodules, the dual space $\mathcal{M}^*$ is automatically a Banach bimodule over $\mathcal{A}$ via the actions $a \cdot \varphi(m) := \varphi(m \cdot a)$ and $\varphi \cdot a(m) := \varphi(a \cdot m)$ for all $a \in \mathcal{A}$, $m \in \mathcal{M}$ and $\varphi \in \mathcal{M}^*$. A *derivation* of an algebra $\mathcal{A}$ into a bimodule $\mathcal{M}$ is a map δ which satisfies $\delta(ab) = a \cdot \delta(b) + \delta(a) \cdot b$ for all $a, b \in \mathcal{A}$. Examples include the *inner derivations* $\delta_m(a) = a \cdot m - m \cdot a$ for $m \in \mathcal{M}$ fixed. Finally, $\mathcal{A}$ is said to be *amenable* if all derivations of $\mathcal{A}$ into dual Banach bimodules $\mathcal{M}$ are inner.

In this talk we shall discuss the problem of similarity of abelian, amenable algebras of operators on a Hilbert space $\mathcal{H}$ to C^*-algebras.