Proper cocycles and extensions of L_p-bounded Fourier multipliers

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Abstract

One of Haagerup's results gives a transference method from Fourier multipliers on a lattice of a locally compact group to the whole group. For a lattice $\Gamma < G$, any bounded function m on Γ which gives rise to a completely bounded Fourier multiplier on the group von Neumann algebra $\mathcal{L}(\Gamma)$ can be transferred to a function $\tilde{m}$ on G with

$$\|T_{\tilde{m}}\|_{cb, \mathcal{L}(G) \to \mathcal{L}(G)} \leq \|T_m\|_{cb, \mathcal{L}(\Gamma) \to \mathcal{L}(\Gamma)},$$

where $T_{\tilde{m}}, T_m$ are Fourier multipliers associated with $\tilde{m}$ and m that are defined on the group von Neumann algebras $\mathcal{L}(G)$ and $\mathcal{L}(\Gamma)$, respectively. In this talk, we will present generalisations of Haagerup's result to the non-commutative L_p-spaces for any $1 < p < \infty$. As an application, we obtained new L_p-bounded Fourier multipliers on $\mathrm{SL}(2, \mathbb{R})$ from the Hilbert transform on its lattice $\mathrm{SL}(2, \mathbb{Z})$.

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