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Equivariant Eilenberg-Watts theorem for locally compact quantum groups

Let A and B be two von Neumann algebras. We write $\mathrm{Corr}(A,B)$ for the category of A-B-correspondences, whose objects consist of Hilbert spaces endowed with an appropriate A-B-bimodule structure. As a special case, $\mathrm{Rep}(A) = \mathrm{Corr}(A,\mathbb{C})$ is the category of all normal, unital $*$-representations of A on Hilbert spaces. In the seventies, M. Rieffel proved that there is a categorical equivalence

$$\mathrm{Corr}(A,B) \simeq \mathrm{Fun}(\mathrm{Rep}(B), \mathrm{Rep}(A)),$$

where the latter is the category of all normal $*$-functors $\mathrm{Rep}(B) \to \mathrm{Rep}(A)$. This is a von Neumann algebra version of the celebrated Eilenberg-Watts theorem. In this talk, we explain how this result can be generalized to the setting where the von Neumann algebras A and B are upgraded with actions $A \curvearrowleft \mathbb{G}$ and $B \curvearrowleft \mathbb{G}$, where $\mathbb{G}$ is a locally compact quantum group.