

DUALITY FOR CROSSED PRODUCTS OF OPERATOR SPACES AND THE APPROXIMATION PROPERTY OF HAAGERUP–KRAUS

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Crossed product-type constructions for actions of groups on general operator spaces seem to be necessary in the study of several concepts coming from abstract harmonic analysis, such as non-commutative Poisson boundaries and (jointly) harmonic operators. This is suggested by work of Izumi, Jaworski-Neufang, Neufang-Runde, Kalantar-Neufang-Ruan, Salmi-Skalski and Anoussis-Katavolos-Todorov to name a few.

We will present a duality theory for crossed products of (dual) operator spaces by locally compact groups, which generalizes the usual crossed product construction for von Neumann algebras. As applications, we obtain a dynamical characterization of groups with the approximation property, improving a recent result of Crann and Neufang. We also identify certain classes of $L(G)$ -bimodules as well as classes of $L^\infty(G)$ -bimodules as crossed products and obtain a less technical proof of a result of Anoussis, Katavolos and Todorov.

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