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Stable rank and real rank of group C^ -algebras*

The stable rank and the real rank of a C^* -algebra A have been introduced by Rieffel and Brown and Pedersen, respectively, as non-commutative analogues of the complex and the real dimension of topological spaces. In fact, for the algebra of continuous functions on a compact Hausdorff space X one has $RR(C(X)) = \dim X$ and a similar formula for $sr(C(X))$. Both of these ranks (in particular the condition $RR(A) = 0$) have played a significant role in the classification of C^* -algebras, and there is now an extensive literature available, especially on group C^* -algebras. The talk will focus on recent work with R. J. Archbold (Aberdeen, Scotland) and will discuss formulæ for the ranks of group C^* -algebras $C^*(G)$ for various classes of locally compact groups G , such as nilpotent groups, motion groups and crystal groups.