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Title: Asymptotic Unitary Equivalence and Applications

Abstract: Let C be a unital separable amenable C^* -algebra and A be unital separable simple C^* -algebra. Suppose that h_1 and h_2 are two unital monomorphisms from C to A . When are h_1 and h_2 asymptotically unitarily equivalent? i.e., when are there a continuous path of unitaries $\{u(t) : t \in [0, \infty)\}$ in A such that $\lim_{t \rightarrow \infty} u(t)^* h_1(c) u(t) = h_2(c)$ for all c in C ? In the talk, we will give a K-theoretic necessary and sufficient condition for these two monomorphisms asymptotically unitarily equivalent (at least for the some important cases). We will also give a bijective map from the asymptotically unitary equivalence classes of unital monomorphisms from C to A and an invariant set. Applications of these results to the Voiculescu AF-embedding problem and the Elliott program of classification of amenable simple C^* -algebras will be given.