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Basic homotopy lemmas via abstract classification

Basic homotopy lemmas, as a first approximation, are results saying that an approximately central unitary in a C*-algebra can be connected to the unit by a continuous path of approximately central unitaries. Going back to work of Bratteli, Elliott, Evans, and Kishimoto from the '90s, they feature heavily in the Gong-Lin-Niu classification of simple nuclear stably finite regular C*-algebras.

A different approach to classification (joint work with Carrión, Gabe, Schafhauser, and White) avoids the use of these basic homotopy lemmas, and produces an abstract classification of *-homomorphisms under minimal hypotheses. Moreover, the generality of our classification of *-homomorphisms allows us to prove a basic homotopy lemma in greater generality as an application. I will discuss our basic homotopy lemma and its relation to classification.