

The complexity of the relation of unitary equivalence for automorphisms of separable unital C^* -algebras

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A classical result of Glimm from 1961 asserts that the irreducible representations of a given separable C^* -algebra A are classifiable by real numbers up to unitary equivalence if and only if A is type I. In 2008, Kerr-Li-Pichot and, independently, Farah proved that when A is not type I, then the irreducible representations are not even classifiable by countable structures. I will show that a similar dichotomy holds for classification of automorphisms up to unitary equivalence. Namely, the automorphisms of a given separable unital C^* -algebra A are classifiable by real numbers if and only if A has continuous trace, and not even classifiable by countable structures otherwise.