

- ILIJAS FARAH, *Elliott's program and descriptive set theory.*

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After his success in classifying approximately finite-dimensional C^* -algebras by K -theory more than three decades ago, George Elliott proposed that more general nuclear C^* -algebras might be classifiable by K -theoretic invariants. The ensuing Elliott classification program has enjoyed tremendous success and achieved a number of spectacular results ([7]). However, counterexamples constructed by Rørdam and Toms showed that the program in its original formulation needs to be revised ([1]). This was followed by further spectacular results ([8]). In the first lecture I will present the current state of the art in classification of nuclear C^* -algebras. No previous acquaintance with C^* -algebras will be assumed.

In the second lecture I will introduce the emerging theory of descriptive set-theoretic analysis ([5]) of Elliott's program ([4], [3]). C^* -algebra ultrapowers (e.g., [6]) will be the theme of the third lecture ([2]).

[1] G.A. Elliott and A.S. Toms. Regularity properties in the classification program for separable amenable C^* -algebras. *Bull. Amer. Math. Soc. (N.S.)*, 45(2):229–245, 2008.

[2] I. Farah, B. Hart, and D. Sherman. Model theory of operator algebras I: Stability. *Bulletin of the London Math. Soc.*, to appear.

[3] I. Farah, A. Toms, and A. Törnquist. The descriptive set theory of C^* -algebra invariants. *IMRN*, to appear. Appendix with Caleb Eckhardt.

[4] I. Farah, A.S. Toms, and A. Törnquist. Turbulence, orbit equivalence, and the classification of nuclear C^* -algebras. *J. Reine Angew. Math.*, to appear.

[5] G. Hjorth. Borel equivalence relations. In *Handbook of set theory*. 2010.

[6] E. Kirchberg. Central sequences in C^* -algebras and strongly purely infinite algebras. In *Operator Algebras: The Abel Symposium 2004*, volume 1 of *Abel Symp.*, pages 175–231. Springer, Berlin, 2006.

[7] M. Rørdam. *Classification of nuclear C^* -algebras*, volume 126 of *Encyclopaedia of Math. Sciences*. Springer-Verlag, Berlin, 2002.

[8] W. Winter. Nuclear dimension and \mathcal{Z} -stability of pure C^* -algebras. *Invent. Math.*, 187(2):259–342, 2012.