Mathematics, Statistics, and Computer Science **@ UIC**

Set theory workshop

Applications of descriptive set theory to classical dynamical systems, part 2

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Abstract: In 1932 von Neumann proposed the project of classifying smooth measure preserving transformations. As part of the project he raised the question of whether every ergodic measure preserving transformation of the unit interval is isomorphic to a diffeomorphism of a manifold. Despite deep progress on both questions, they remained open until recently. The lecture presents joint work with B. Weiss that shows that the classification problem is impossible to solve–because the associated equivalence relation is not Borel (and moreover is strictly more complicated than any S^∞-action). Along the way the authors made progress on the second problem, by showing that a quasi-generic class of transformations can be realized as diffeomorphisms of the 2-torus. This class is the source of the complexity of the classification problem.

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