

COLLOQUIUM

JOHN CLEMENS

Department of Mathematics, SIUC

12-4-14

NECKERS 156 | 3PM

RECEPTION IMMEDIATELY FOLLOWING IN THE MATH LIBRARY

COMPLEXITY OF THE ISOMORPHISM PROBLEM FOR SUBSHIFTS

[ABSTRACT]

Given a finite set A of symbols, we can form the Bernoulli shift on A . This is defined by equipping the set of all bi-infinite sequences from A with an appropriate topology, and considering the left-shift map S on these sequences. By a subshift we mean a subset of this space which is both topologically closed and invariant under the shift map. Subshifts form a rich class of dynamical systems which have been widely studied in symbolic dynamics. We say two subshifts are isomorphic if there is a homeomorphism between the underlying subsets which commutes with the shift map.

In this talk, I will give an introduction to these systems, and then consider the problem of classifying subshifts up to isomorphism. We can use tools from descriptive set theory to give a precise gauge of the complexity of this problem, namely, we can show that the classification problem is of maximum complexity among equivalence relations with countable equivalence classes. I will also discuss free subshifts (those without any periodic orbits) and generalizations to subflows of other countable groups.