

Speaker: Sherwood Hachtman

Title: Borel determinacy and computability in higher types

Abstract: In recent years a number of connections have been discovered between Borel determinacy and aspects of computability, including in Borel combinatorics and countable Borel equivalence relations by work of A. Marks, higher randomness by work of J. Reimann and T. Slaman, and infinite time Turing machines by work of P.D. Welch. Meanwhile, the seminal results of H. Friedman and D.A. Martin show that any proof of Borel determinacy requires some form of appeal to the axioms of Replacement and Powerset.

To better understand the extent to which use of higher types is essential to particular applications, it is helpful to have simple characterizations of the strength of determinacy in terms of the minimal structures necessary to compute winning strategies. In this talk we describe a refinement of the Martin-Friedman results phrased in the language of E -recursion theory. We give a brief introduction to E -recursion, and describe equivalences between determinacy for levels of the Borel hierarchy with the existence of E -closed sets with Moschovakis witnesses and satisfying instances of Powerset.