



The Olivetti Club Presents

Ian Smythe

Tuesday 4:30 pm

26 November 2013

406 Malott

Diagonalize This

In epochal papers published in 1874 and 1891, Cantor produced two proofs of the uncountability of the set of real numbers. The first of these uses the completeness of the real line in a crucial way, while the second is the now famous “diagonal argument” using decimal representations. In this talk, we will re-examine these seemingly dissimilar proofs as instances of a much more general diagonalization technique, which constructs objects satisfying an infinite list of conditions via approximations. This technique can then be applied to construct continuous nowhere-differentiable functions, isomorphisms between dense linear orders, infinite sets of numbers not computable from each other, and much more. In fact, a generalization of this technique lies at the heart of Cohen’s proof of the independence of the continuum hypothesis, and much of the set theory which has followed in its wake.

Refreshments will be served at 4:00 pm in the math lounge.