

# BI-CO MATHEMATICS COLLOQUIUM

Mark Dominus

## "Topology of data types"

Monday, January 27, 2014

Talk at 4:00 – H109

Tea at 3:30 – KINSC Math Lounge, H208

### Abstract:

There is a surprising correspondence between computability theory and classical topology. Computability is continuity, open sets are recursively enumerable, spaces are Hausdorff if they admit a definable  $\neq$  operation, and a set over which one can universally quantify is compact. The natural numbers, being non-compact, can't be exhaustively searched: given a predicate  $p$  you can't guarantee to find a number  $n$  for which  $p(n)$  is true—there might not be one, and so your search might continue forever. But the naturals can be embedded in a compact set that *can* be exhaustively searched. Since this larger type can be modeled on the computer, I will present a simple computer program which, given any predicate  $p$ , either locates an  $n$  for which  $p(n)$  is true, or correctly asserts that no such  $n$  exists.

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