Department of Mathematics
University of Notre Dame

Noah Schweber - Proof School

LOGIC SEMINAR

Guest Speaker: Noah Schweber
Proof School

Date: Tuesday, February 25, 2025
Time: 2:00 PM
Location: 125 Hayes-Healy Bldg
Zoom URL: NA

Lecture Title:

On two modal model theory questions of Hamkins/Woloszyn

Abstract:

Hamkins/Woloszyn, *Modal model theory*, introduced a natural (family of) semantic(e)s for first-order modal logic: "worlds" are structures, and the accessibility relation is replaced by homomorphisms between structures. They showed that this logic contains a surprisingly large amount of information; for example, there are modal sentences which are validities iff CH holds. In this talk I'll present two theorems, which address questions Hamkins/Woloszyn raised. First, I'll show that there is a modal first-order sentence distinguishing the natural numbers amongst all models of true first-order arithmetic, so that modal equivalence properly refines elementary equivalence even on countable structures. Second, I'll show that - assuming large cardinals - this modal semantics is set-theoretically definable, and under a stronger large cardinal hypothesis modalization *always* preserves set-theoretic-definability (e.g. modal second-order logic also has set-theoretically-definable semantics). The first of these results came out of conversations with Wesley Holliday, where we independently considered the same notion of modal logic.