Why Proof Competency is Not Enough: Logical Consistency When Evaluating Mathematical Arguments

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Dr. Roh's talk will be a research talk focusing on student thinking and teaching in proof classes. The material will be accessible for upper division undergraduate and graduate students, who have taken a proof-based course.

Abstract:
Research on undergraduate students' engagement with mathematical proof has often focused on construction, reading comprehension, and validation of proof. While these aspects highlight important forms of proof activity, this presentation focuses on students' evaluative reasoning in the context of mathematical proof, particularly two theoretical constructs that reflect this dimension:

- Logical consistency (LC), defined as an individual's mathematical thinking characterized by the absence of logical contradictions when evaluating a mathematical statement and its accompanying argument.
- Proof competency (PC), defined as an individual's evaluative reasoning skills for determining whether an argument serves as a valid (dis)proof of a mathematical statement.

Whereas logical consistency concerns the internal coherence of students' evaluations across the three components (statement truth, argument intent, and argument validity), proof competency concerns the correctness of each evaluation.
To investigate these constructs, my research team developed the LinC (Logical inConsistency) instrument and administered it to over 200 undergraduate students across multiple institutions (Roh & Lee, 2024). In this talk, I will present the structure of the LinC instrument, and evidence that supports the construct validity of the instrument for assessing LC and PC. I will also report how LC and LC are related, and how LC is associated with students' experience in proof-oriented mathematics courses.

Monday, March 9
4:00 pm
PS 308

Zoom Meeting ID: 850 1022 5613

For colloquium guests, refreshments begin at 3:30 pm in PS 308