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What does this mean? Model interpretation capacities of undergraduate differential equations students

With each passing day, society is becoming more and more reliant on mathematical models. And yet, to most of the public, these models are black boxes. The responsibility of interpreting model results in light of the real world, is left to a small group of people with the skills to peer inside the boxes and tell the rest of us what is going on. Undergraduate mathematics students are likely candidates for this job. But are we confident they are graduating with the capacities necessary to interpret modelling results?

In this talk, I will present preliminary results from a case study which investigates the mathematical model interpretation capacities of undergraduate differential equations students. The case study involves a small group of undergraduate students at the University of Calgary, who completed an introductory differential equations course in the Fall of 2024 and were asked to complete two interviews. The first, a task-based interview completed in pairs, where they complete a problem designed to engage the students in the full modelling process, and another problem which specifically asks them to interpret the results of a model. Second, participants complete a semi-structured interview, with the researcher, where they were asked to expand on interpretations seen in the task-based interview and were asked specific questions about model interpretation.

By outlining the capacities that undergraduates currently do/do not demonstrate, I hope to show which areas of the undergraduate mathematics curriculum work well, and other areas that need attention.