



## Verification of human-level proof steps in mathematics education

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*Abstract.* Automated mathematics tutorial systems need support from a reasoning module which can verify the correctness of students' contributions. However, current systems typically do not reason at a level similar to the student's reasoning level, and do not fully account for underspecified or ambiguous inputs. We present a domain-independent method for automatically verifying correct proof steps and detecting standard reasoning errors. We use a depth limited BFS proof search to determine and maintain multiple possible interpretations consistent with the given proof step, we are able to resolve or otherwise propagate underspecification and ambiguity which occurs due to unrestricted user input. Our approach has been implemented in  $\Omega$ MEGA<sup>CORE</sup>.

*Key words and phrases:* proof tutoring, automated reasoning, proof checking, proof reconstruction, mathematics education.

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