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Automation of mathematics examinations.

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Summary: Assessment is a key component of all educational systems, and automatic online assessment is becoming increasingly common for formative work in mathematics. This paper reports an investigation of the extent to which contemporary automatic assessment software can automatically mark answers to questions from existing high-stakes mathematics examinations. The questions are taken from a corpus of publicly available core mathematics questions designed for high-achieving students aged approximately eighteen at the school-university interface. We focus on the extent to which objective properties of each final answer may be automatically established and the extent to which automatic marking reasoning by equivalence supports assessment of students' methodology. Our results show that transcribing existing paper-based mathematics examinations into an electronic format is now feasible for a significant proportion of the questions as currently assessed. The most significant barrier to using contemporary automatic assessment is the requirement from examiners that students provide evidence that they have used an appropriate method.

Classification: D50 U50 U70

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