Understanding and creating to better understand instrumental proof using QED-Tutrix

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Abstract:

The understanding and modelling of the conditions for learning mathematics, together with the creation of models and computational means to understand them, are at the heart of an emerging research. The QED-Tutrix system, from an earlier project that supports the student in solving problems of proof, has been designed with respect to the discourse habits of the classroom and has been developed with a focus on the designer/user dialogue. In this system, the original creation of inferential graphs, associating a set of structured reasoning to the statement of a problem so that a virtual pedagogical agent can follow the student in his proof, is based on the referential of mathematical properties and definitions used in schools. Thus, the justification of a reasoning step is made according to this referential and allows legitimizing the necessity in the linking of knowledge. However, until now, these justifications have been strictly verbal, following the example of reasoning in traditional mathematics. What happens if some inferences are justified by an interacting technological tool, such as calculations (numerical or symbolic), the construction or animation of a dynamic figure, the execution of an algorithm, the creation of a recognized mathematical process, the use of an automated reasoning tool or the modelling of a real-life situation?

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