

Making higher mathematics teachable in MTA

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Maple T.A. stands for Maple Teaching and Assessment. The system is based on Maple, a computer algebra system. On the one hand Maple supports analytic and algebraic calculations. On the other hand it is a very common programming language at the Vienna University of Technology.

Maple T.A. is designed to simplify the creation of examples and the arrangement of tests. For the examples there are many different possible question types like multiple choice, fill in the blanks, numeric, multipart or true/false questions. The choice of the proper question type depends on the topic of the question and on the aspired goal of the designer.

In the Maple T.A. system there are some special commands similar to the Maple ones. But it is also possible and sometimes necessary to use the original Maple commands depending on the complexity of the example.

One important advantage of Maple T.A. is that through the creation of one exercise one gets many different examples as a result. The principle of the example is every time the same but the numbers or functions are randomized so they change at every request. So the tutors only have to create a few examples to offer a great questionnaire for the students. Additionally cheating at tests is not so easy.

The weakness of the grading in Maple T.A. first occurs in the courses of mathematics of electrical engineers in the first semester. In the chapter of integration an partial fraction decomposition has to be done. Due to fairness we decided to develop a grading which considers every single coefficient of the fraction and not only the whole expression.

It was possible to create randomized numbers within Maple T.A. To offer a big variety of examples it was also necessary to create random functions and expressions. Therefore the question designers developed a new library including some different commands for creating.