

Enabling Web-access to a Database of Calculus Problems Using \LaTeX , PHP and \LaTeX2HTML

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Abstract In the beginning of 2002, we initiated an investigation to develop possible solutions for providing the material used in the teaching of calculus to students at Lappeenranta University of Technology. We decided to write the pages in question in the \LaTeX language. We also wanted to use database and network solutions for the finalized version of these pages. We had chosen to use network solutions because the material, which is available on the Internet i) is easy to reuse, transform and combine with other materials ii) can be easily accessed at least with fast connections iii) is accessible 24 hours a day iv) can be accessed by many users. We wanted to use a database in order to provide students with tools for performing searches on the calculus information. The students can then study the material that they feel is the most interesting and then hopefully begin to carry out their own research and form a view of mathematics. Therefore we have taken a constructivist approach to the learning process. The \LaTeX -files, which are entered into the database with all the necessary keywords, form the core of the solution. Based on the keywords, the database knows where each file is located. It includes information, from the area of mathematics, on whether the file is an exercise, solution, hint or information. The database alters the user's view of its contents by using the keywords that are included in the above-mentioned base \LaTeX files. Now, any of our lecturers can contribute new material to the database by using a very simple interface and \LaTeX . Lecturers can also easily combine weekly tutorials and even whole examinations from the contents of the database. So far, we have stored hundreds of exercises with hints and solutions on our web server in addition to some theory that we felt is necessary for the students. In this paper, we present the complete procedure from the creation of the \LaTeX files to a functioning Web-environment.