

# Maple – aspects in teaching mathematics

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**Abstract** - Computer mathematics systems are very widely solicited by education and research institutions. Maple is one of these systems. It is a very attractive environment for making different calculations and analytical transforming. It is a system used for representing the mathematical knowledge, capable of writing, saving and utilizing the information. Using the system one can perform numeric calculus as well as symbolic calculus and graphics. The system helps not only in learning mathematical notions but also in forming an algorithmic and experimental thinking for solving different problems in the daily life. As far as the system is not difficult in use, it makes the students interested in utilizing it, this way becoming more attracted by the subject of mathematics. Education being one of the fields that should keep up with the development of information technology makes Maple become very welcome at mathematical classes.

**Index Terms** – computerized environment, creative thinking, electronic system of mathematic calculus, laboratories for mathematics, media.

## I. INTRODUCTION

Electronic systems of mathematic calculus are increasingly used in schools and universities, as well as in science all over the world. A special role has Maple. Maple is a modern computerized environment that includes a large number of didactical and professional functions. Using this system one can perform both numerical and symbolic calculations and graphs or preview in action the way the problems are solved. Maple is a system used for presenting mathematical knowledge, capable of forming, saving and utilizing the information.

The use of the computerized environment – Maple, helps not only to acquire the concepts of mathematical modeling, but also to develop the algorithmic thinking and to experiment solving various problems of everyday life.

## II. MAPLE – DIDACTIC ASPECTS OF THE SYSTEM IN THE PROCESS OF TEACHING MATHEMATICS

Maple contains an impressive number of tools that transform the mathematical algorithms into programs. The Maple's memory includes all basic mathematical functions, a large number of special functions, algebraic and logical operations, almost all the algorithms included into the course of superior mathematics in university.

In present Maple with its versions (Maple V, Maple 6-14 and the latest Maple 15) is one of the advanced systems of mathematical calculus capable of performing different projects. Thus, using Maple one can perform a large variety of algebraic complex transformations and simplifications, can calculate symbolical finite and infinite sums and products, can calculate limits and integrals, can solve analytically

algebraic systems of equations and inequalities, can calculate the determinants of matrices, can determine rapidly all the roots of a polynomial, can find all the solutions of differential equations and systems of equations, as well as some classes of partial derivative equations.

Maple is not only showing the result of the taken problem, but is capable of describing the intermediate calculus (e.g., decomposition of a rational function into a range of elementary functions, the fact that is important in integral calculus).

The system contains graphic media with a great potential: the system can rapidly draw the most diverse graphs of functions with one variable or with more variables.

Unlike other mathematical software, Maple can operate with huge numbers having accurate calculations as result. If other programming languages need additional sources for such cases, Maple, for example, calculates the factorial of large numbers without any difficulty.

An enormous privilege of the system is the simplicity and the natural way of writing the operators and the algorithms. Usually, the declaration of the type of variables is not mandatory, there is no need in a special way to distribute the memory for saving one or other information. Being a simple system, Maple, exceeds many programming languages, which is due to the large number of commands, which leads to a practical and short way of program writing. These explain the simple mode of getting working skills with the system quickly.

Maple is widely spread in the world. It is used in different fields of scientific and engineering research, being as well highly regarded in the training process. The producing company **Waterloo Maple Software** is always concerned of improving the system: the monthly magazine deals with analysis of the current problems,

there is the internet site, where the users are actively involved [1].

Due to the organized management, Maple has huge perspectives by adapting to the problems of research and studies. We have to remind, that the use of computers is just an element in the process of teaching mathematics. It allows having another approach in learning mathematical notions, with an individual creative character for solving problems and helps extend control over the students' level of knowledge.

It is well known that many mathematical questions, due to the large volume of calculations, require much time for presenting many topics. In this case the Maple system is the solution.

We have to bear in mind that education is the field that should always keep up with present innovations and technologies, in order to have a modern generation that would bring our society to a higher level of development.

### III. CONCLUSION

The use of new information technologies in education is the common goal for culture, the primary key for learning the world, the basis for technical- scientific progress and the main element in forming intellectuals.

The development of modern computer environments, the emergence of integration of different types of information, allow the growth of methodical efficiency of teachers, that permits working on new

services that keep up with the modern computerized society.

The uses of computers at mathematics, as well as at other courses, lead to the development of independency in activity, and in the future to decision making in situations of vital importance.

Having classes in front of a computer, makes students more interested in the subject taught differently from traditional methods. Thanks to computer use many mathematical difficulties may disappear. Students start perceiving computers as a means to study, having to use an original mathematics laboratory. Until recently we were used to know about laboratories for physics, chemistry, biology and others from the curriculum, now laboratories for mathematics should be present as well in our lives and the computer technology allows it. Solving problems using a computer, develops in students creative thinking, helps them be up to date in everything. Only in this way the research interest is developed, that leads to creative work in the future.

The education being the field that needs primarily adapt to the conditions dictated by the civilization of advanced countries, must take into account the level of society's development. Therefore, to be in line with EU requirements concerning the process of training young specialists, the use of information technology is a question of time that we have no right to miss.

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