
"active webcam page" inurl:8080	<i>Web cameras.</i>
intitle: "toshiba network camera -User Login"	<i>Toshiba Network Cameras</i>
intitle: "speedstream Router management interface"	<i>speedstream Router management interface access</i>
inurl: vswebapp.exe	<i>Microsoft Virtual Server 2005 access</i>
inurl: "level/15/exec/-/show"	<i>Open Cisco Devices</i>
intitle: "ivista.main.page"	<i>Security Cameras</i>
intitle: "everfocus edsr applet"	<i>My favorite security cameras – most of them using default login details – admin, admin</i>
filetype: ctt "msn"	<i>MSN Contact Lists</i>

Conclusion

The intent of this paper is to educate web administrators and the security community in the hopes of eventually securing this form of information leakage.

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USE OF THE MAPLE SYSTEM IN MATH TUITION AT UNIVERSITIES

Tsvetanka Kovacheva

Abstract: *The following article explores the application of educational technologies at a University level and their contribution in enhancing the educational effectiveness. It discusses the capabilities of computer algebra systems, such as Maple. It is integrated in the math tuition of the Technical University (TU) in Varna and is used by its students during laboratory exercises.*

Key words: *education, educational technology, computer algebra systems.*

Introduction.

For the purpose of improving the effectiveness of the study process it is necessary to apply a variety of educational technologies (ET). They have two *basic components*:

- ❖ *technologies/media used in the study process*, through which different educational resources are introduced such as printed materials, projector equipment, TV & video and all other related resources, computer-based resources (computer algebra systems (CAS), spreadsheets, databases, Power Point, www, email), multimedia, etc.
- ❖ *technologies of the study process*, which include planning, organization, carrying out and evaluation of the entire process. They respectively comply with the aims and purposes of education, the design of co-ordinated tuition, integrated curricula, study approaches, principles and methods of evaluation. Appropriate media needs to be selected for the purposes of the study process. This choice is influenced by main factors such as aims and time, media access, human resources, costs. In math education for the engineering speciality computer-based resources play a great role due to the capabilities those resources come with:

- ❖ regarding the requirements towards the educational technologies to offer:
 - enormous storage of information/data,
 - high-speed operation;
 - flexible data handling.
- ❖ regarding the requirements for the educational technologies applied in class to offer:
 - interactive learning;
 - self-study;
 - incorporation of different teaching approaches reflecting the aims of the study process.

Choice of a Math computer algebra system. Main capabilities of the Maple system.

Series of CAS have been released for symbolic (analytic) computations as well as realisation and various numerical methods. Some of the most commonly-used CAS are Mathematica, Maple, Matlab, Mathcad, etc. [1]. The first two are aimed at solving scientific problems while the next two is reserved more for engineering problems.

There is a tendency for integrating all the different systems. For instance, Mathematica and Maple systems both offer good options for visual programming, Matlab also holds an analytical calculations library while Maple and MathCad allow for compatibility with Matlab.

The Maple system was designed by a research group at Waterloo University, Canada [5,13]. It provides for automated computations of any degree of complexity [2,4,7,8,9,10]. More than 3 500 integrated functions are included. The system also allows for Latex documents format conversion. It is available and compatible for all operating systems – Windows, Macintosh, Linux, UNIX. Some of its features that deem it suitable for the study process, of university students in particular, are the following:

- interactive mode of operation;
- handling defined mathematical calculations;
- no need for previous experience with computer equipment;
- an easy to learn and use system;
- uncomplicated and convenient interface;
- user-responsiveness;
- opportunity to cover a great deal of the math tuition for the engineering specialities of the first and second course.

Those are the chiefest considerations in choosing the application of Maple system during laboratory exercises (LEs) with math students at TU. One of the latest versions of the system is used, i.e. Maple 9 [6].

Computations in the system are done in *two ways*: by analytical and numerical methods. In the usage of the first method greater exactness can be achieved. Due to the fact that many problems cannot practically be solved using the analytical method, numerical methods are resorted to, which are built into the system library.

The system of analytical calculations consists of cores, written in C-language procedures, and written in the Maple language library and interface.

The system contains *a manual*, giving information about interface features, symbolic and numerical computations, numerical and symbolic solution of equations, computation of mathematical functions, linear algebra, graphic representation of calculations, programming.

The interface features are as follows (fig.1,fig.2):

- good word processor;
- multi-window tasking;
- representation of incoming and outgoing data in the form of mathematical formulae;
- great graphics capability where graphics can be transferred to and viewed in separate windows or within documents;
- possibility to use hyperlinks and create e-documents;
- easy keyboard management with the help of the main menu and the Tools panel.

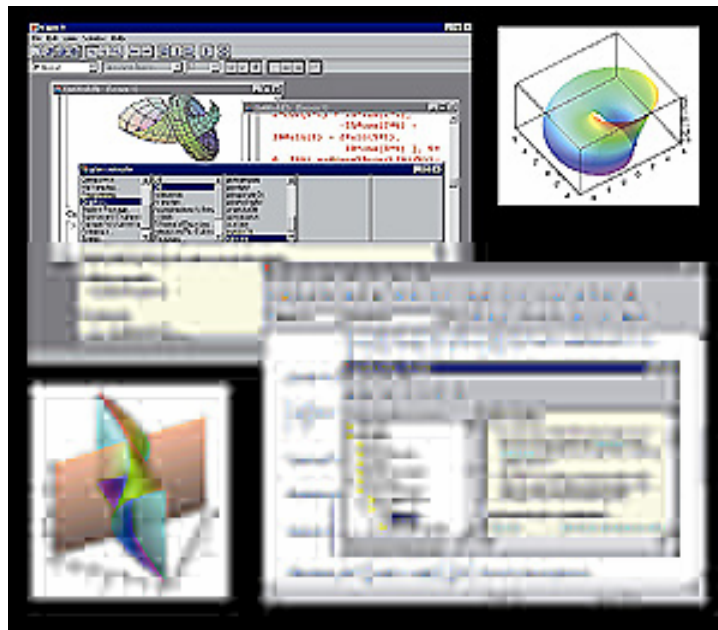


fig.1

The system effectively performs *symbolic and numerical calculations*:

- differentiation of functions;
- numerical and analytical integration;
- calculations of limit functions;
- expansion of functions in the series;
- calculations of sums and products;
- Laplace transforms;
- discrete Z-transforms;
- Fourier transforms;
- work with continuous functions, defined on parts.

The system provides for numerical and symbolic solution of problems. Those include:

- symbolic series calculations;
- solution of linear and non-linear system equations, systems of differential equations, transcendental equations, systems of inequalities.

The system performs *computation of elementary and special mathematical functions*, allowing for computation of all elementary and most special mathematical functions, recalculation of the coordinates of points for a multitude of coordinate systems.

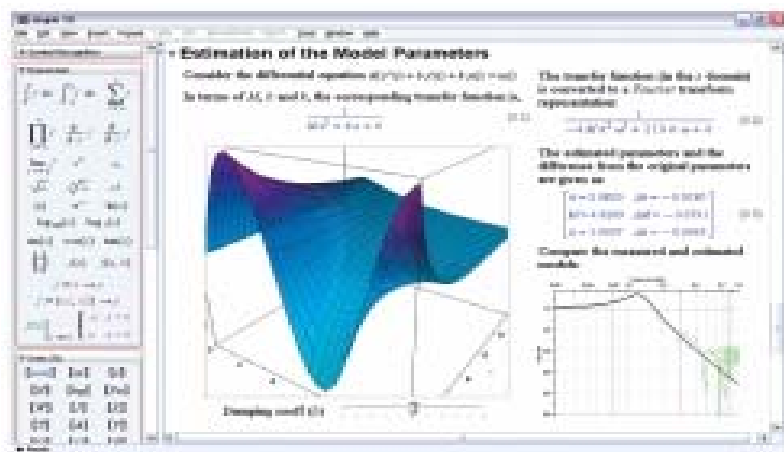


fig.2

In the area of *linear algebra* the system enables for more than 100 operations with vectors and matrices; as well as solution of linear system equations; matrix formation and their transformation; assessment of the eigenvalues and eigenvectors of matrices.

With regards to *graphic representations* it creates:

- multi-function graphic manipulation;
- change of the kind of axis (on a linear or logarithmic scale);
- function graphics in Cartesian and polar coordinate systems;
- special kinds of graphics (points from massive, vector diagrams on a level, etc.);
- graphics allowing the solution of differential equations;
- 3D graphics with functional colouring;
- intercepting objects in space;
- animated graphics, etc.
- Typical *programming features* that accompany the Maple system are:
 - powerful inbuilt procedure programming language;
 - simple and common syntax of the programming language;
 - vast entry of mathematical types of data;
 - types of data entered by user;
 - comprehensive libraries for expansion of the programming language;
 - construction of outer functions and procedures;
 - programming interface with programming languages such as C, Fortran and Latex.

Maple 9 Student Edition *System Requirements for Linux*® are [13]:

- Red Hat® Linux 7.1, 7.2, 7.3, 8, 9;
- SuSE® Linux 6.4, 7.0, 7.2, 8.0, 8.1;
- Mandrake Linux 8.1, 8.2, 9.0;
- Intel Pentium III 650 MHz or fully compatible;
- 128 MB of RAM*, 256 MB recommended;
- 250 MB of free disk space;
- CD-ROM drive (for CD installation);
- X11 R5 or R6. Display supporting at least 16-bit color at 800 by 600 resolution;
- Internal TCP/IP connections enabled.

Maple system application in math laboratory exercises.

LEs are an important part in the math tuition for university students [3,12]. They are intended for students in their first and second year in nearly all specialties at TU. Maple system is taught alongside the following subjects:

- Mathematics-1 (M1) – linear algebra (polynomials, matrices, determinants, inverse matrices, systems of linear equations), vectors, eigenvalues and eigenvectors of a matrix, products of vectors (scalar, cross and scalar triple), line equation in plane, conic sections, limits, continuity, derivatives, differentials, analyze of function;
- Mathematics-2 (M2) – undefined and defined integrals, plane and line equations in space, functions of two and higher variables (partial derivatives, differentials, extreme), series, complex analysis (complex numbers, elementary functions of complex variable, analytical functions and Cauchy-Riemann equations);
- Mathematics-3 (M3) – ordinary differential equations, integrals (double, triple, line and surface), complex analysis (integral of function of complex variable, Cauchy's theorem and formula, Residuum's theorem), Fourier and Laplace series and transforms, probability theory and statistics.
- Numerical methods (NM) – systems of linear and non-linear equations and systems, numerical differentiation and integration, approximation of functions, ordinary and partial differential equations.
- Statistics (ST) – combinatorics, probability theory, statistics.

The purpose of the exercises is:

- extending and consolidating of students' knowledge acquired in lectures and seminars;
- introducing students to the Maple system options and getting them used to work with a ready-made system;
- graphic representation, demonstration, modelling and analysing of end results;
- introducing students to methods of numerical solving of problems.

LEs's main task is that they are carried out in accordance with the general study aims of the lectured subject. Appropriate selection of study materials is necessary as well as optimization of the LEs.

For the purpose of raising the effectiveness of the study process there is a preliminary introduction of students to *the topical curriculum* of LEs conforming to the curricula of both lectures and seminar exercises. This ensures suitable choice of methodology and consistency in LEs. Students have the chance to work with the system of LEs and its continuity which enables them to prepare for dealing with all tasks ahead. Planning the term course of LEs allows for establishing the assessment criteria and continuous checks of students' progress.

Each subject holds 7 laboratory exercises. *The structure* of every LE is as follows:

- *theoretical part*, involving introduction to the topic, brief theory and presentation of basic Maple commands;
- *practical exercises*, introducing a step-by-step detailed analysis of a given problem using Maple commands. Students copy and perform the operations under a lecturer's supervision;
- *progress tasks* - problems that require each individual student's work with Maple;
- *progress checks* – questions to consolidate the theoretical material taught.

During LE the lecturer ensures that the study process is carried out in the right manner. Group work method in LEs develops students' skills for team work. Many students' gathering around only one computer is not recommended. Proper assignment of tasks needs to be delegated to avoid idleness in class. Checks and instructions are carried out for the whole group to economise time. Discourse and discussions facilitate the build-up of long-term and in-depth knowledge.

LE is what is known as 'learn by doing it' [11]. Therefore, students should be assisted in taking maximum advantage of this type of study.

At the end of LE each student has an individual check with the lecturer on the validity of their solutions to the given problems, they are then aided in the draw up of conclusions and evaluation of their work. The final assessment of each student is complex and takes into account their progress during LE, marks from the progress checks and/or written assignments.

Students prove to benefit from exercises involving introduction and application of various numerical methods in solving particular problems. They provide a basis for comparison between the analytical and the approximate solutions. The following subjects feature topics such as:

- in M1, solving of system equations (method of simple iteration, the consecutive approximation method, Seidel's method);
- in M2, solving defined integrals numerically ([rectangle rule](#), [trapezoidal rule](#), [Simpson's rule](#));
- in M3, solving of ordinary differential equations (Euler's method, Runge-Kutta method);
- in NM, solving of systems of linear equations (of simple iteration, the consecutive approximation method, Seidel's method), non-linear systems of equations (numerical integration method, Newton's method), approximation of functions (Lagrange's interpolating polynomials and Newton's method), partial differential equations (Libman's method).

During ST LEs there is the option to calculate the statistics characteristics of a given massive of data, to approximate the data through given dependents, to generate random quantities, to numerically estimate statistics functions, to carry out various transformation and to represent them graphically.

Conclusions.

The Maple system holds great potential in assisting the study process of the chapters included in the Math tuition. Every lecturer aims at being most collaborative with their students and in order to achieve efficiency he/she has to creatively make use of the system's capabilities. With the lecturer's consideration, depending on experience, various exercises to suit the purposes of the LEs can be performed. Such could only enhance the in-depth comprehension of the material taught and likewise motivate students' interaction.

The application of Maple in LEs allows for greater amount of solved problems among students, helps them determine certain properties unaided and thence comprehend the content of notions more thoroughly, their properties, theorems and the relations between them.

Students learn to independently solve problems with the help of a CAS and to select methods for their solving. Mastering Maple during the first years at University is beneficial to students not only in solving mathematical problems but also any complex applied technical problems they will encounter.

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