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STUDY SUPPORT WITH PREVAILING DISTANCE FACTORS FOR SUBJECTS OF THEORETICAL BASE FOR STUDY

Summary. Study support with prevailing distance factors for subjects of the theoretical base for study is the title of project of Human Resource Development Operational Programme of European Social Fund. The objective of the project is to create study support concerning mathematics, descriptive geometry, physics and chemistry to enable individual study, and thus to minimize the number of contact lessons with the teacher.

POMOCE DYDAKTYCZNE Z PRZEWAGĄ ELEMENTÓW PRZEZNACZONYCH DLA STUDIÓW ZAOCZNYCH DLA PODSTAWOWYCH PRZEDMIOTÓW TEORETYCZNYCH

Streszczenie. Projekt, który osiągnął sukces w ramach pierwszego wezwania Programu Operacyjnego „Rozwój Zasobów Ludzkich” Europejskiego Funduszu Społecznego, stawia sobie za cel opracowanie materiałów dydaktycznych z matematyki, geometrii wykreślnej, fizyki i chemii w taki sposób, żeby umożliwić samodzielne studiowanie i minimalizować liczbę godzin bezpośredniego kontaktu z nauczycielem.

1. Introduction

The number of student-teacher contact lessons in subjects of the theoretical base for study has had a declining tendency already for a long time. In the combined form of study, we consider the number of contact lessons to be so small that the self-study of some parts included in syllabuses becomes necessary.

On the one hand, owing to time constraints a teacher has not a possibility of explaining all content area included in teaching plans at a sufficiently deep level. On the other hand, subjects of the theoretical base are for the majority of students demanding to such an extent

that they need more thorough guidance. One of possibilities of solving this situation is represented by study materials that are just being prepared.

2. On the ESF Project

The project “Study support with prevailing distance factors for subjects of the theoretical base for study” is being dealt with at VŠB – Technical University of Ostrava. Project partners are the Regional Centre of Education and Training in Most, University of Defence in Brno and Technical University in Liberec. The project was launched on the 5th of January 2006 and will be completed on the 4th of January 2008. Works on the project are performed under the supervision of a governing body composed of the project manager and persons guaranteeing individual subjects.

The target of the project is to elaborate such learning texts that will be able to compensate the above-mentioned shortage in teacher-student contact lessons. In the texts, emphasis will be put on the thorough clarification of content area on a step-by-step basis. For purely methodological reasons, illustrativeness is preferred over mathematical accuracy in some cases. Study support has been elaborated for altogether 24 subjects of bachelor and master study programmes at six (technical) faculties of VŠB – Technical University of Ostrava, namely: Basic Mathematics, Basic Geometry, Basic Physics, Bachelor Mathematics I, Bachelor Mathematics II, Mathematics I, Mathematics II, Mathematics III, Engineering Mathematics, Mathematics on PC, Descriptive geometry, Constructive Geometry, Probability, Statistics, Mathematical Analysis I, Mathematical Analysis for IT, Algorithms and Data Structures, Computer practices, Numerical Methods, Physics I, Bachelor Physics, Physical Measurement, Chemistry I, Chemistry II.

In addition to classical printed texts drafted for self-study, learning texts in electronic form supplemented with hypertext references and enriched with multimedia and feedback elements are prepared. Furthermore, a system of LMS-based administrative support (by means of Internet) is produced. A part of the project is also the creation of a test task bank in electronic form for each of the subjects, or a suitably aggregated group of subjects. The electronic form of the texts is freely distributable on CD and also via the Web (www.studopory.vsb.cz).

3. Dealing with the Project

The first task was to ensure a fixed structure of all texts in order they may be well-arranged and search-friendly.

All texts concerning mathematics, constructive (descriptive) geometry and computer subjects have the fixed structure of all texts to be well-arranged and search-friendly. They always contain, at the very beginning, guidelines for studying that explain the meaning of used icons and colour differentiation.

Study guide has two tasks: it motivates the given chapter in its introduction and also functions as instruction to proceed further.

Targets followed will acquaint students with the fundamental content area of the given chapter which is believed the students should know after studying the chapter.

Expected knowledge covers the content area which the student is expected to master before studying the given chapter and which the student should brush up if need be.

Only after that explanations follow; in mathematics they are divided in a usual way into definitions, propositions, or proofs, and may be commented. All these explanation elements are differentiated graphically and by colour. Illustrativeness can be achieved by means of images and in some electronic texts also by animations. The role of animations is irreplaceable in the explanation of parts requiring dynamic representation, e.g. the clarification of the term 'derivation'.

To understand thoroughly the content area, solved tasks are provided, in which exercises illustrating the explanation are solved in detail.

The student can practice the content area studied in a part designated tasks for student's own solving, which is followed with results of tasks for student's own solving. Into the text, more difficult, marked exercises are included for students more deeply interested.

Check questions aim at enabling the student to verify the degree to which the student has understood the explanation. They are formed by a set of questions supplemented usually by four answers, of which always at least one answer is correct.

Answers to check questions enable the checking of correctness.

Another possibility of verifying the understanding of the text is a check test containing a set of exercises concerning the content area learnt, which is usually again supplemented by four answers, of which just one answer is always correct.

Test results state correct answers to exercises of the check test.

At the end of each chapter, or subchapter, a lesson summary is given which the student is expected to master after studying the chapter.

At the end of each text, study literature is presented.

The final phase of the project is the evaluation of project efficiency. A degree of the usefulness of the elaborated texts in the course of study is found via questionnaire.

4. Examples of Texts Prepared

Below some examples of prepared study support materials are presented.

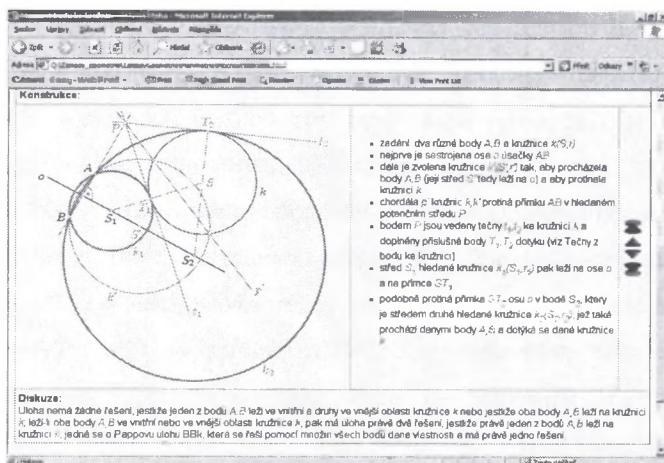


Fig. 1. Apollonius problem BBK
Rys. 1. Zadanie Apolloniusa BBK

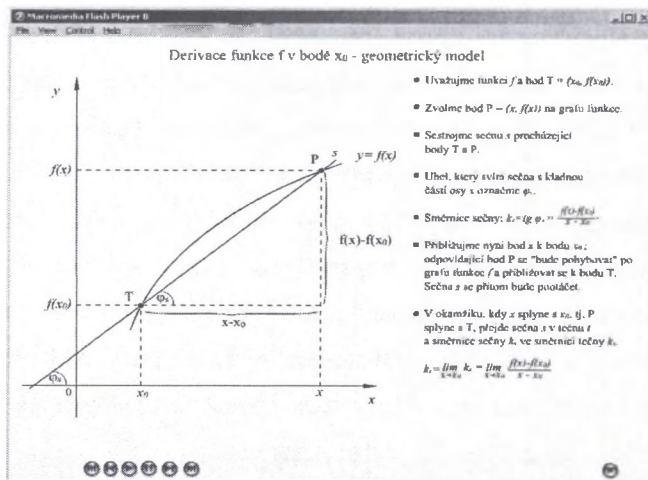


Fig. 2. Geometric meaning of the derivative
Rys. 2. Znacenie geometryczne pochodnej

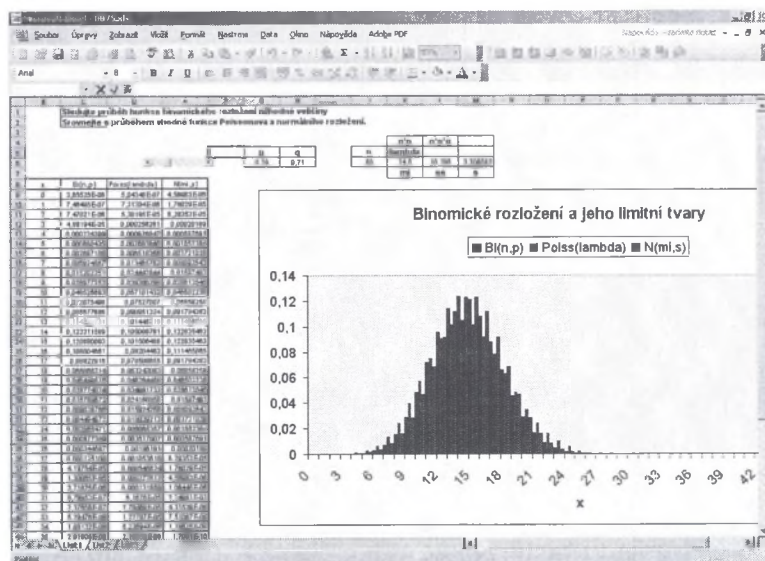


Fig. 3. Normal and Poisson distributions as approximation to binomial distribution
 Rys. 3. Aproksymacja rozkładu dwumianowego rozkładem Poissona i rozkładem normalnym

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