Education and Culture

Leonardo da Vinci

New Challenges in e-Learning of Mathematics via EVLM and IDeLC Projects

Snezhana Gocheva-Ilieva, Assen Rahnev
Faculty of Mathematics and Informatics,
University of Plovdiv, Bulgaria

We present: key problems, ideas, aims and results in using new ICT in education of mathematics

Projects:
- EVLM - European Virtual Laboratory of Mathematics, Leonardo da Vinci pilot project
- IDeLC - Interfaculty Distributed e-Learning Center, university scientific project

European educational atmosphere:

- total popularity of computers and ICT
- rich educational innovative e-learning systems
- developed new programs of studies
- powerful mathematical software: Mathematica, Maple, Matlab, SPSS, …

Some negative trends in higher education in mathematics:

- a declining level of mathematical knowledge among first years university students and secondary school graduates
- unattractive outdated traditional ways of teaching mathematics in many universities
- misusing of new technologies by part of the university teachers, etc.

The EVLM project www.evlm.stuba.sk

European Virtual Laboratory of Mathematics

European pilot project within the Leonardo da Vinci program
Coordinator: Slovak University of Technology in Bratislava, SR
Partners: 6 universities + 2 non-governmental organisations

- University of Plovdiv, BG
- University of West Bohemia, CR
- Miskolc University in Hungary
- University of Limerick, Ireland
- University of Salamanca, Spain
- Coventry University, UK
- Tullossilta, Finland, FI
- Slovak Society for Geometry and Graphics, SR

The EVLM project

www.evlm.stuba.sk

Aims:

- increasing the overall level of mathematical knowledge
- promoting e-learning in mathematics
- promoting usage of interactive computer algebra systems, online calculations, online consultancy and others
- providing large database of online mathematical resources
- improving the quality e-content of mathematics materials by applying the newest ICT
- providing help for teachers and trainers in using the most advanced educational tools and environments

Webpage of the EVLM Central portal

EVLM

EUROPEAN VIRTUAL LABORATORY OF MATHEMATICS

Central portal

Education and Culture

Leonardo da Vinci

Links to National portals

Project No. 2006 - SK/06/B/F/PP - 177436 Project webpage central @ evlm.stuba.sk Statistic

About EVLM

Subjects and topics

File types

Other links

DATABASE Portal

Direct links to

e-BOOKs
Teacher's guide
Student's guide

FACTs

CONSULTATION REQUEST

FEEDBACK QUESTIONNAIRE

EVLM pages, portal and on-line database
were developed as results of the project
funded by European Commision with the following aims:

- to promote e-learning in Mathematics
- to provide solutions for different target groups and help for teachers and trainers
- to enhance skills in using the most advanced educational tools and environments
- to help in development and authorship of electronic learning materials
- to provide consultancy on how to use existing materials
- to provide space for sharing elearning resources through the EVLM Portal
- to offer a consultancy service in mathematics (either electronically or personally)
- to contribute to increase of the overall level of mathematical knowledge
- to enhance competence in mathematics within the indicated target groups, students, teachers, trainers, scientists and researchers.

AREA FOR PROJECT PARTNERS

Project outline:

- a network of National Centres of Mathematics located at eight partner countries
- each National Centre hosts a portal in the respective national language providing a virtual database of mathematical resources
- the National Centres offer consultancy services in mathematics and e-learning materials
- communication between the project team ensure that any request for assistance and consultancy will be dealt

Webpage of the Bulgarian portal

EVLM

ЕВРОПЕЙСКА ВИРТУАЛНА ЛАБОРАТОРИЯ ПО МАТЕМАТИКА
БЪЛГАРСКИ ПОРТАЛ

Образование и култура
Leonardo da Vinci

Връзки към националните портали

Проект № 2006-SK/06/B/F/PP-177436 Българска стр. на проекта Пишете ни

За EVLM портала
Раздели и материали
Типове файлове
Други хипервръзки

БАЗА ДАННИ НА ПОРТАЛА

e-КНИГИ:
Наръчник на учителя
Наръчник на студента

webMathematica портал

Факти

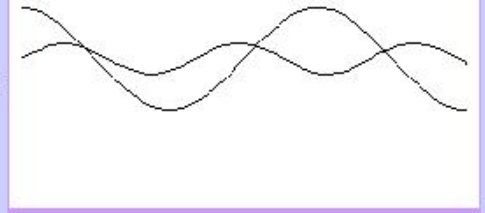
Заявки за консултация

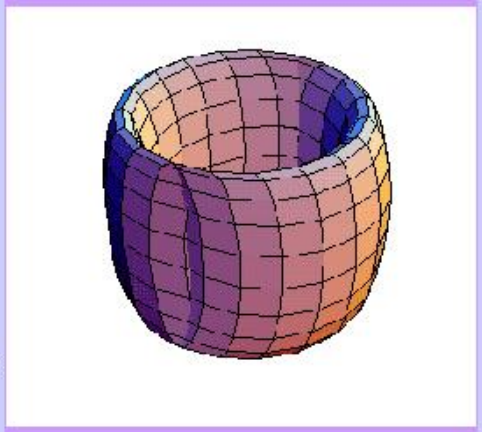
Въпросник за обратна връзка

ЦЕНТРАЛЕН ПОРТАЛ

ЕВЛМ страниците, порталът и он-лайн базата данни бяха разработени като резултат от проекта, спонсориран от Европейската Комисия с цел:

- да развива он-лайн обучението по математика
- да предлага помощ на различни целеви групи, включително учители и преподаватели
- да спомага за подобряване на уменията при използване на най-съвременни образователни средства и среди
- да подпомага разработката на собствени материали за електронно обучение
- да осигурява консултации по използването на наличните материали
- да осигурява пространство за обмен на ресурси за електронно обучение чрез EVLM Портала
- да предлага консултационна служба по математика (по електронен начин или лично)
- да допринася за издигане нивото на математическите знания
- да засили компетентността по математика на избраните целеви групи потребители: студенти, учители, преподаватели, учени и изследователи.





EVLM БЪЛГАРСКИ НАЦИОНАЛЕН ПОРТАЛ, ПОДДЪРЖАН ОТ
Plovdiv university "Paisii Hilendarski"

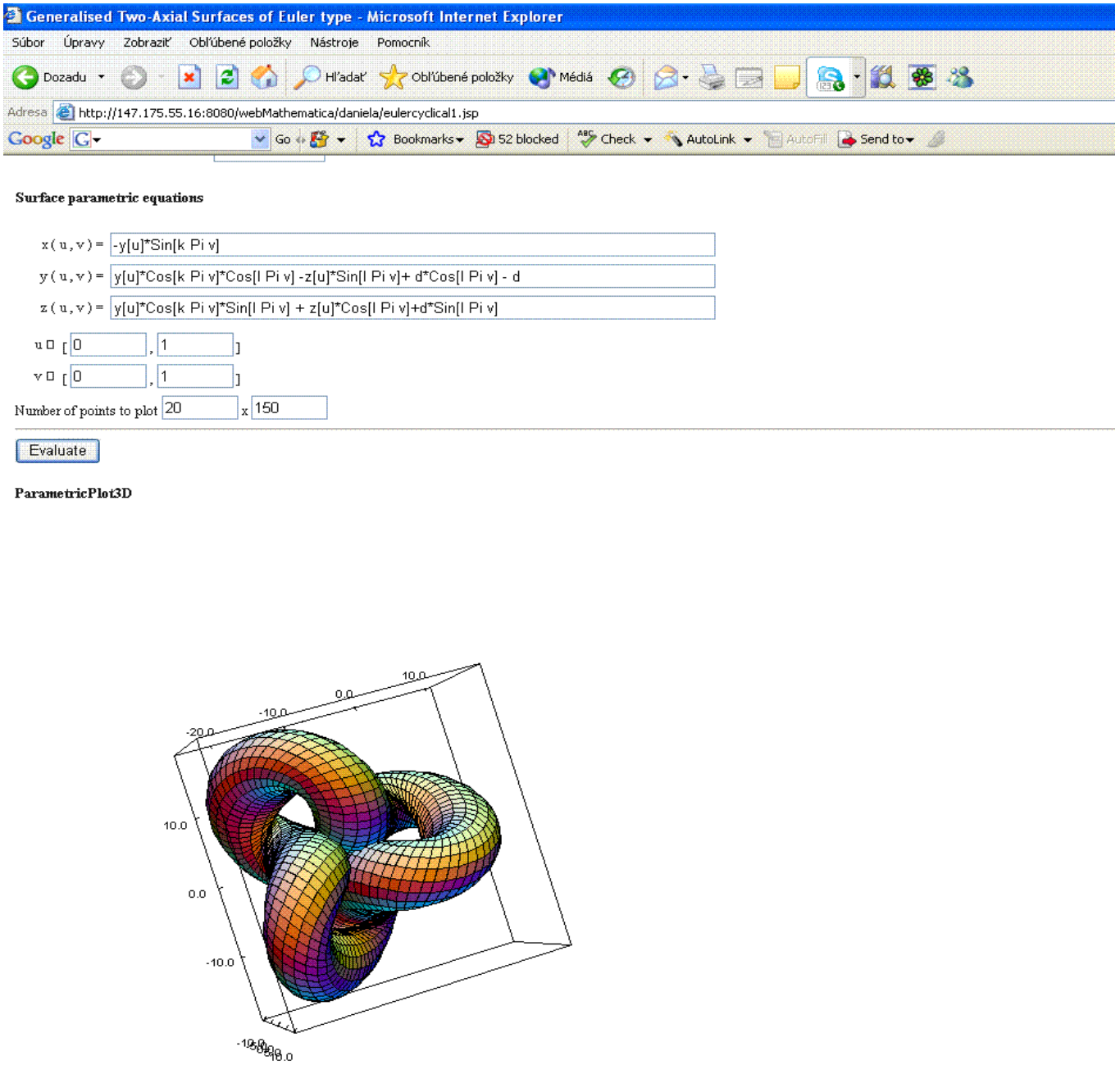
004596
Bravenet Free Counter
VIEW SITE STATS

Results:

- e-content in XML, MathML, pdf, jsp, nb, html and other
- materials with the use Mathematica, Maple, Matlab, GeoGebra, SPSS, webMathematica, …
- Teacher's guidebook
- Student's guidebook
- online courses with the use of the virtual database for students and trainers
- National Centres are open to provide consultancy and help

EVLM in action:

Surface patch modeling by webMathematica



The IDeLC project
Interfaculty Distributed e-Learning Center

New scientific project, funded by Plovdiv University ‘Paisii Hilendarski’, Bulgaria (2008-2009).

Basic aims:

- improving the overall electronic servicing by creating of newest ICT
- implementation in 3 faculties of Plovdiv University

Specific research aims:

Development and implementation of:

- new e-learning and m-learning technologies on campus based intelligent methods
- agent-oriented methods
- distributed electronic testing clusters for group testing
- electronic clusters for e-content (math, economics …)
- eGenerators
- providing innovative software security methods and database consistency

Ideas of DeLC

Definition:

The Distributed e-Learning Center (DeLC) is an example of a Network-Based Education, which allows effective communication between cooperative physically dispersed programs, tools, students, educators, and administrators.

Implementation: The development of the first J2EE-based version of a DeLC is finished in 2003-2006.

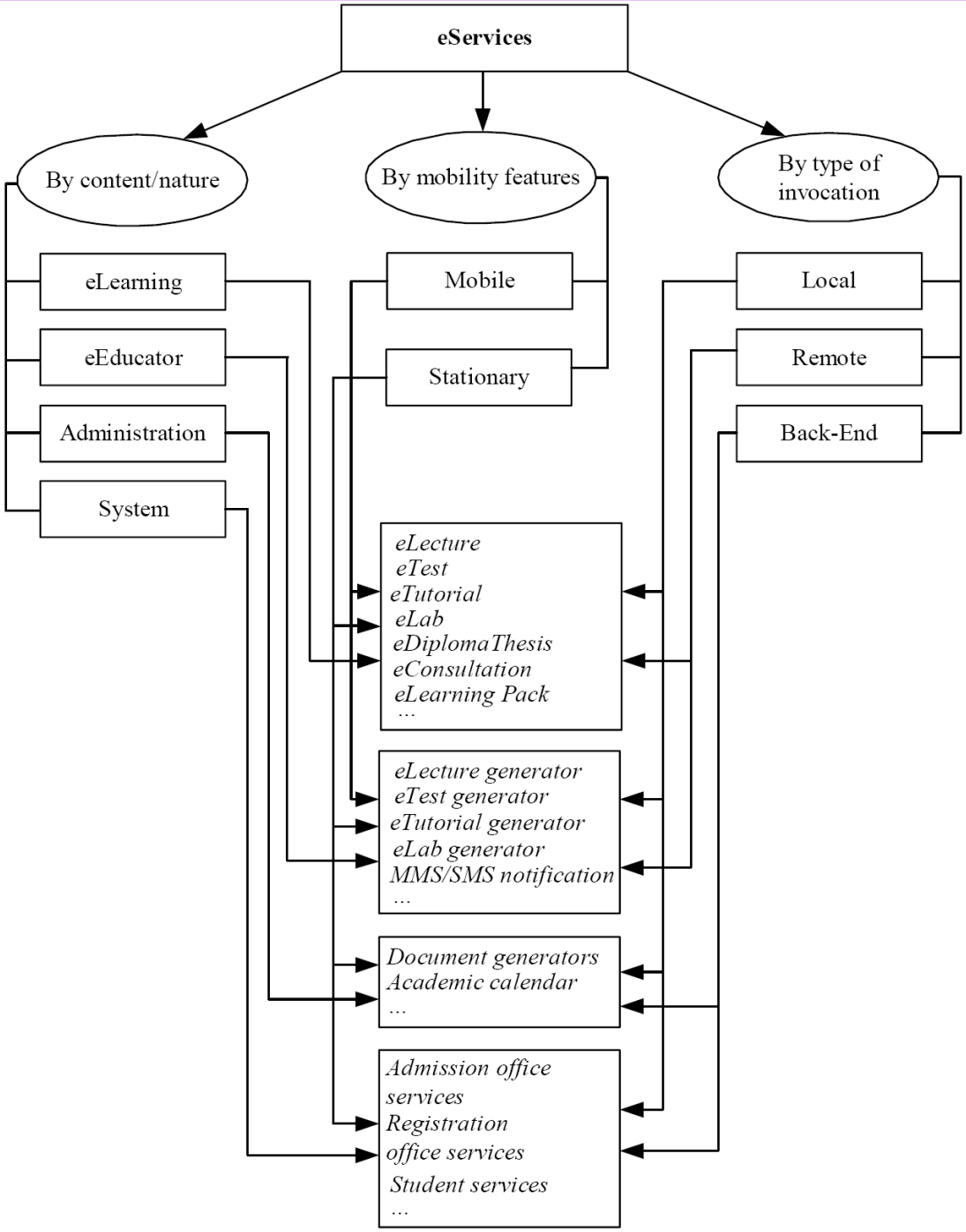
Technologies in DeLC:

- J2EE provides standard architecture for development, deployment and execution of applications in a distributed environment.

- Applications in J2EE may use a set of standard services such as: threads, distributed resources, transaction, management, security, client and database access.

The DeLC e-Services structure groups:

- content or nature
- type of mobility features
- type of invocation



The DeLC e-Services classification:

a) by content/nature in 4 classes:

- e-Learning (eLecture, eTutorial, eTest, eConsultancy, …)
- e-Educator (eLecture generator, eTest generator, …)
- Administration (eDocument, eCalendar, …)
- System (eAdmission, eRegisration, …)

b) by mobility features in 2 classes:

- Mobile
- Stationary

c) by type of invocation in 3 classes:

- Local
- Remote
- Back-End

About e-Serveces in DeLC:

Each e-Service:

- has a common unified structure that allows easy development of the system by adding new e-Services and integrating them with the existing eServices
- can be represented as a container, consisting of profile (meta-information) and functionality.

  The profiles give information about e-Service's content (semantics), user's group, interaction with other e-Services etc.

  The functionality can be presented as a set of rules specifying the actions to be realized.

Further enhancement of DeLC and EVLM in IDeLC project

- provision of multi-agent systems, supporting intelligent mobile services
- development of m-services:
  - mLecture
  - mTutorial
  - mTest
  - mConsultation
- development of electronic clusters, allowing hold the group examination in the 3 faculties
- all services require a detailed creation of the appropriate e-content in specific areas of education by EVLM database

Conclusions:

The results and impacts of the projects EVLM and IDeLC:

- will contribute to the radical innovation in e-teaching and e-learning in PU
- are in favor of the European society requirements

We are convinced that only the collaborative work between mathematical communities thorough Europe and all over the world could raise the overall level of mathematics education based on the current powerful ICT.

I would like to thank organizers of this collaborative and very useful WSEAS conference!

Thank you for your attention!