

PROGRAM COMPLEX OF DISTANCE DESIGNING AND E-LEARNING

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ABSTRACT

The purpose of this paper is a method to simplify not only development of e-learning systems for various subjects but also conducting eLearning on their bases. The infobase of the method is electronic documents of multifarious data format namely from Microsoft Office type to documents of well-known mathematical packages. As to the software of the technique, it was developed as a distributed program complex, where its server part is able to serve a huge number of clients, which are self-adapting units for interaction with components of diverse external environments.

KEYWORDS: *modelling e-learning systems, self-adapting units*

1. INTRODUCTION

It is undoubtedly true, that software developed *with glance of perspective* is in popular demand among users because they themselves are able to do necessary *variations without programming*. Besides, increasing of burden in computer networks requires special knowledge from developers in development of applications with *effective using of resources*, and practical skills in designing systems, which are *flexible in adjustment, simple in acquisition and reliable in operation*. Moreover, one of hits can be recognized *self-adjusting systems* possessing the ability to auto tune to every user's requirement and as a result they have wide spectrum of application. Particularly, systems with properties written in *italic font* are called-for with educational establishments as tutorials because of their universality at organization of e-learning. However, one thing is certain, development such systems is not only very complicated but also perceptibly costly. In turn, bases of mutually beneficial agreements between users and developers of similar software are their low prices and functionality completeness. It turned out, cutting of production costs and improvement quality of eLearning systems can be achieved the following ways:

- Using environments of object-oriented programming (OOP) is very efficient because of main paradigms of OOP as encapsulation, polymorphism and inheritance. The programs, developed in these environments, are of high quality, but their updating requires involvement of high-class coders. For instance, using visual component library of either C++ or Delphi environment, programmers can develop windows applications, save them into the component repository as classes and then use their descendants for computer modeling analogous applications. However, generating new classes of parent ones can be made only through coding [1]

- Application of instrumental systems can be handy for users who cannot code. However, potentials of these systems are restricted with their usable areas. Consequently, for every area developers have to develop own instrumental system and it is the biggest disadvantage of this way. For example, the well-known RAR archiver allows to create self-unpack archival quality file and this program cannot be used for other tasks;

- Simulation of modeling environments are very essential at constructing of training simulators, which imitate action of explored objects. These simulators can be used as virtual reality systems where users can observe objects and work with them similarly to natural conditions. However,

functions of simulators are defined with properties of corresponding environments and as a result, there are some problems in combination of simulators of various formats into one complex. By way of illustration, strategic games can be trainers for users to explore systems behaviors. As a result, these clients obtain important skills, which will be useful in practice. Nevertheless, integration of some trainers with different data types into one information space is a formidable problem. [2]

Thus, the problem on development of the system, which possesses both, previously mentioned properties written in *italic font* and advantages in underlined font are very timely. Therefore, the most effective way for solution of the task is ***development of a distributed program complex with self-adapting client parts***. In addition, there are very efficient computer technologies, which can shorten perceptibly time expenses and help to focus on solution of complicated problems. Now, let us consider the description of the offered software in detail.

2. METHODS

The software component of the offered method has been implemented in the capacity of a distributed complex of programs to serve enormous number of client queries without appreciable burden for the server part. The zest of this work is self-adaptation of client applications to every of users because of application of OLE servers such as office applications, mathematical packages and so on. As a result, the offered complex has a scalable architecture because of automatic update with components of external environments. Besides, it is flexible in the plane of choosing SQL Servers and reliable because of using well-known computer technologies ADO, OLE, DataSnap and Real World by Microsoft and Borland. [1]

The given complex has a multi-tier architecture and its server part consists of a FTP server, a database server, an application server and a socket server. As to its client part, it is separated on two classes: “thick” and “thin” clients. Thus, the functions of these applications are explained below more detailed:

- ✓ The FTP server keeps a database and files with contents of lectures, exercises, virtual labs and so on. In turn, there are data or references to them in the database;
- ✓ The data are operated with the database server, where the data themselves are compound documents which involve text, graphics, video, fragments of MSOffice documents and so on;
- ✓ The application server consists of objects where the business logic of the project is implemented. According to the logic, “thick” clients of the complex possess increased powers for operation with the data to model e-learning modules distantly. As to “thin” clients they have lower priority than “thick” ones and only can train at these modules making active computer experiments;
- ✓ The socket server provides connection between client applications and the application server by virtue of TCP/IP protocols.
- ✓ Users as “thick” clients possess ability to adapt automatically to environments where e-learning systems for vary subjects can be modelled. In turn, “thin” clients like “thick” ones have elasticity to these environments to make active computer experiments with built models. In addition, the connection between client applications and external environments is implemented through OLE containers. [3-7]

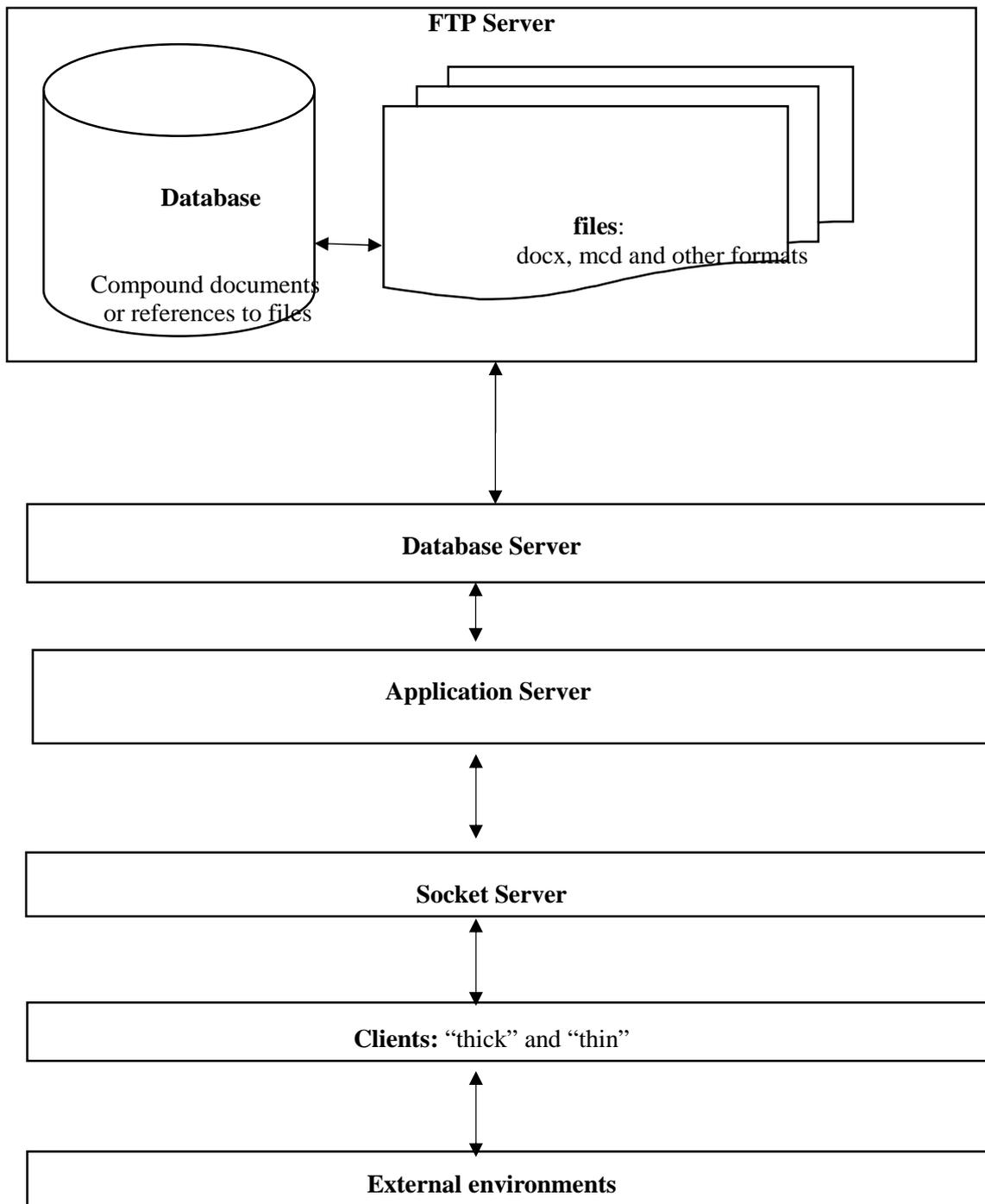


Fig. 1

3. RESULTS

This complex can be used both as a workstation for computer modeling of e-learning modules on vary subjects and as an environment for simulation of lecturers' activities on the base of the built models. Furthermore, using the computer-aided design system of this complex, an e-learning module on mathematics was designed. The basis of the module consists of virtual mathematical laboratories developed in Mathcad and they can be used as simulators of tutors' acts on math. For instance, a

virtual mathematical laboratory was modeled in the computer-aided design system updated with MathCAD tools and as a result, it can be used for active computer experiments to explore properties of well-known quadrature formulas visually.

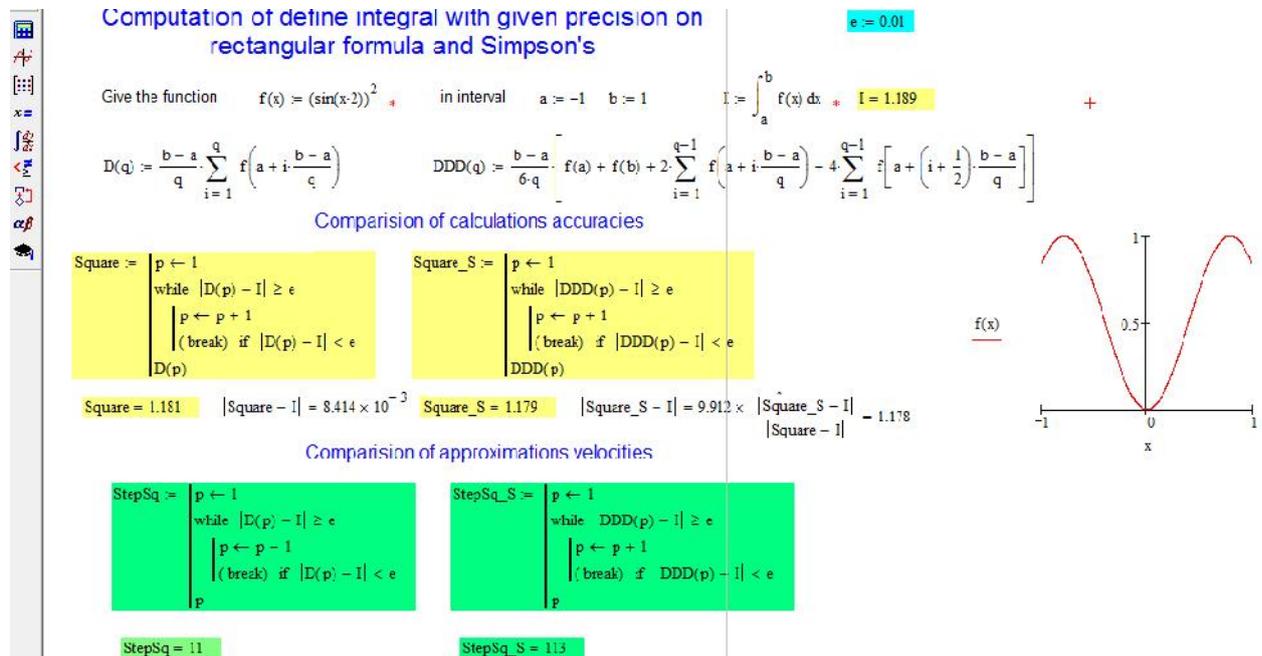


Fig. 2

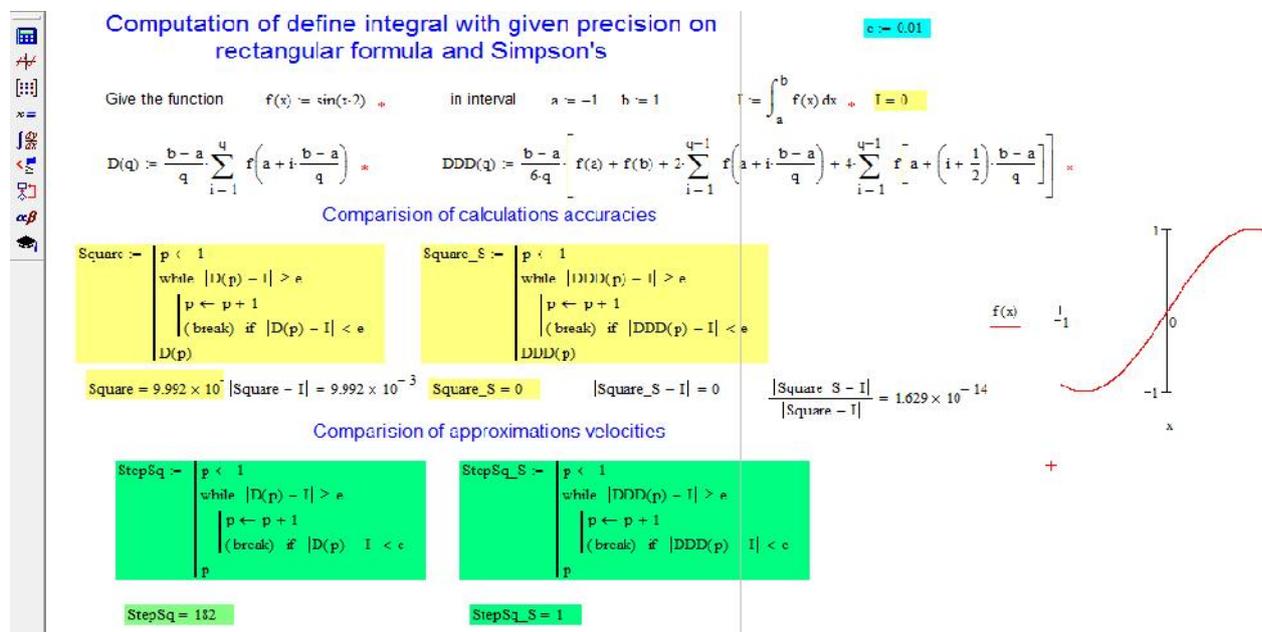


Fig. 3

Comparison of Fig. 2 and 3 shows that, results of approximation velocities depend on the formula, which describes the function. Therefore, users have scientific interest in research of the problem on definition of the rapidest quadrature formula for given class of functions. Generally, this problem is actual in mathematics and many researchers have been exploring it so far.

4. CONCLUSIONS

In conclusion, the offered program complex can be used as an environment both for designing of educational modules on various subjects and for leading of e - learning on their base. In other words, this complex should be imagined as a space station with many updated modules, where some of users have increased powers to reconstruct the station and the other ones can use these rebuilt modules as training simulators to study necessary disciplines. In turn, everyone has got own toolbox taken from a suitable environment for modelling and conduct active experiments with under test objects.

REFERENCES

1. <http://www.marcocantu.com> –Marco Cantu’s website
2. [http:// www.exponenta.ru](http://www.exponenta.ru). - A mathematical site
3. Aripov M., Tashpulatov F. Learning high mathematics on Mathcad base // Journal of the Korea society of mathematical education Series D: Research in Mathematical Education –Korea, 2005 - Vol. 9, No. 3 (ISSUE 23) - P. 269-273.
4. Mersaid Aripov, Farkhod Tashpulatov To one mean of imitating modeling of distributed virtual laboratories// III Congress of the Turkish world Mathematicians, Almaty, Kazakhstan, 30.06.2009-04.07.2009, <http://conf.kaznu.kz/en/CTWM-2009/reports>
5. Tashpulatov F., Abdullaeva N. Application datasnap technology for development an internet-based teaching system on mathematics // Materials of the international scientific conference “Modern problems of applied mathematics and information technologies – Al-Khoresmiy 2012”, Tashkent, 2012, Volume 1. 174-177.
6. F.Tashpulatov, N.Abdullaeva Limitations at development e-learning systems in MathCAD and methods their elimination // Seventh World Conference on Intelligent Systems for Industrial Automation WCIS -2012, Volume 2, 232 -236, Tashkent, Uzbekistan
7. Abdullaeva Nazokat Computer-aided design and e-learning // 2013 Joint International Conference on Mathematics Education. Seoul Nat’l Univ., Seoul, Korea.