Using the FPGA digital processing today is the most effective solution to improve performance DSP devices. This solution allows realizing methods and algorithms using parallel processing of multiple data streams, thereby increasing the overall speed of computation. Also, due to new methods of designing devices based on FPGA design time is compared with the time of development of devices based on DSP. This suggests that the use of FPGAs to implement complex DSP algorithms looks more preferable than developing based on the DSP.

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STRATEGY AND TACTICS OF THE APPLICATION OF COGNITIVE-VISUAL APPROACH ELEMENTS FOR TEACHING MATHEMATICS TO ENGINEERING STUDENTS

VALENTINA VAKULCHYK, ANASTASIYA MATELENAK
Polotsk State University, Belarus

Methodology for the implementation of visual-cognitive approach through the use of algorithms and algorithmic requirements in the process of training engineering students to solve problems in mathematics is designed in the article. Didactic benefits and cognitive capabilities of the designed methodological tools for organizing and activating analytic-synthetic cognitive activity of students are emphasized. It is found that scientifically based and designed incorporation of allocated teaching tools in the process of problem solving allows accumulating the merits of problem and explanatory-illustrative methods of teaching mathematics. In addition, favorable conditions for methodically targeted assistance to students in linking studied topics and concepts to each other implicitly and indirectly contributing to the memorization, comprehension and students' mastering basic concepts and provisions are created in the pedagogical process. Using the potential of visual thinking is considered as an important parameter of influence on the optimization of the organization of students' independent cognitive activity.

Introduction. In recent years pedagogic science has been in search of new forms, methods and means of teaching, as well as specific methods of their usage in the educational process in order to improve learning efficiency. One such tool is a visibility of presenting information to be studied, which educational value is rather high. Particular attention should be paid to the issue of implementation of the visibility principle based on the development and usage of students' visual thinking reserves. In this connection, it makes sense to develop special methodical didactic means of presenting mathematical information, which would provide availability of its acquiring at all stages of the cognitive cycle, as well as facilitate its structuring, systematization and logical organization [1].

The overview of publications on the topic. We hold the view of those authors who defend the thesis that visual thinking is the kind of image thinking, but they don't coincide (N.V. Brovka, V.A. Dalinger, N.A. Reznik, O.O. Knyazeva, A.N. Chinin, M.A. Choshanov, etc.).

Accepting the existence of visual thinking as an indisputable fact, they point out the cognitive property of visualization. It is emphasized that when the visualization is integrated into the learning process not only it "helps" the learner in the organization of their analytical and mental activity, especially at the stage of perception and processing of studied information, but also provides meaningful knowledge by significantly affecting the depth of awareness of perception and understanding of specifically represented mathematical object, concept or a proposition.

Regarding our study we understand cognitive visual approach as the principle of formation of educational technology on the basis of the interconnection and unity of abstract and logical content of educational material and of methods with visual-intuitive ones. This approach involves the use of cognitive (cognitive-semantic) features of visual information (for example, when working with illustrations). Cognitive Visualization holds the key to solving many educational problems. This takes into account the role of color, enhancing the perception, memorizing and comprehension of educational information more than with black-and-white presentation of information. This approach encourages to widely use colors and shapes, graphs and drawings, complex visual cognitive tasks and animations in the process of learning [2].

In this article we will focus on the development of the skills of cognitive independence when using the particular algorithm approach for solving problems

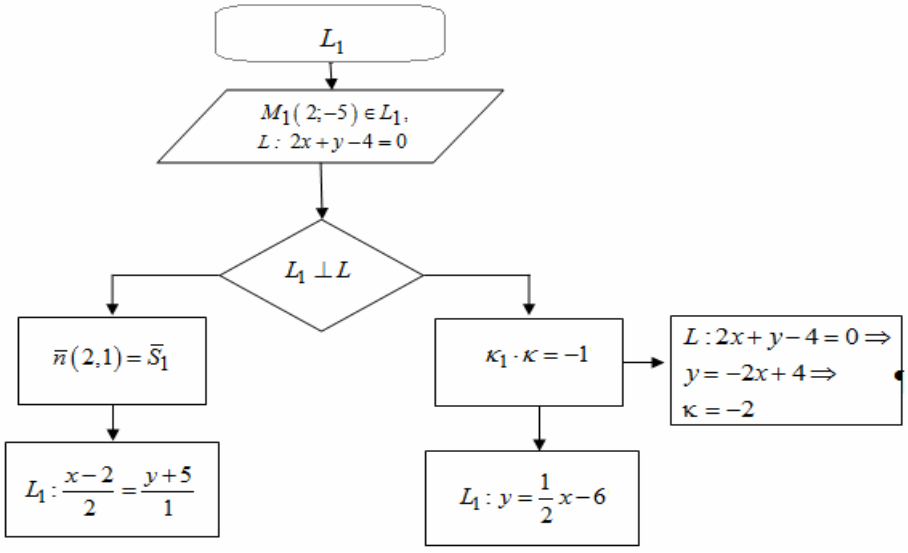
Thus, **the purpose** of our work is the use of didactic possibilities of the cognitive-visual approach for solving problems in higher mathematics. It is assumed that the presented methodological procedure will allow to organically combine the image and text, mutually enhancing the perception of both, thereby contributing to the development of students' abilities to meaningfully acquire the studied materials, to define the main and discarding the secondary, to analyze, compare, classify and establish.

The results and their discussion. An important criterion of theory assimilation is the ability to solve problems of the studied material. In this connection, however, students' attention should be paid to quite a common mistake, which lies in the fact that the successful solution of problems is perceived by them as a sign of theory assimilation. But the correct solution to the problem is sometimes obtained by a mechanical application of the given formula without understanding the merits of the case. We can say that the ability to solve problems is a necessary but insufficient condition of a deep mathematical theory assumption. One of the objectives of teaching mathematics is to prevent such errors. In addition, the solution of problems in mathematics in the classroom is aimed at the consolidation of students' skills in solving common tasks of a certain type. The conducted empirical analyses have enabled us to design visualized algorithmic instructions or algorithms for the formation of basic skills, the main purpose of which is to teach students to not only mechanically apply formula, but to understand the process of solving tasks. Let's consider making such schemes for the next task.

Example 1. Write the equation of the line L_1 passing through the point $M_1(2;-5)$ perpendicular to the given line L: $2x+y-4=0$.

Solution: Heuristic conversation should "lead" the audience to the vision of two possible ways of solving this task. In order to write down the equation of the line L_1 knowing point $M_1(2;-5)$, it's necessary to find one more element (a vector, a point or a slope ratio) in Table 1. Organized by the teacher students' search activity can lead to the following methods, which can be logically visualized using graphical algorithm scheme. Method 1: The equation of the line L is defined by the general equation, therefore, we know the normal vector of the considered line. Since the lines are perpendicular, we can take the normal vector of line L as the direction vector of line L_1. Therefore, the canonical equation of line L_1 can be obtained. Method 2: Since L and L_1 are perpendicular lines, then $\kappa\cdot\kappa_1=-1$, means that we lead line L to the form of a straight line with a slope, as it is given in Table 2, and we write down the slope of a given straight line. Taking into account the condition $\kappa\cdot\kappa_1=-1$ we define the slope of the line L_1 and write down the equation of the line L_1. Carried out by the teacher, and undertaken by the students search activity steps should be consistently recorded with the help of the graphic algorithm scheme (Fig.).

Conclusion. Activization of thinking through specially organized independent activity generates cognitive independence at a certain level, which is a prerequisite to the development of a student as a cognizer. At the same time you deliberately create conditions for the formation of conscious, optimally probable deep knowledge of the sufficient mathematical apparatus for its successful application in the study of special disciplines, in life and for the acquiring general expertise, as well as contributing to the formation of a scientific worldview of students, education of their endurance and human qualities.



Graphical algorithm scheme

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APPLICATION OF ALGORITHM FOR RADAR IMAGE PROCESSING IN THIRD-PARTY SOFTWARE

YULIA BOGOMOLOVA, VALERY CHERTKOV
Polotsk State University, Belarus

The article presents the review and comparative analysis of the software for radar image processing. The algorithm for selecting the area of a certain height based on the determination of the color range on the radar image is developed. We study how to apply the given algorithm in the software of third-party vendors in the form of function located in the dynamic link library.

Space radar imagery data differ significantly from the data obtained from space in the optical range as when shooting the amplitude and the phase of the signal are registered. Specialized software is required to work with radar images (RI) of primary processing levels. Currently, there are commercial and free software applications specifically designed to work with radar data. For other programs there are special modules that allow processing polarimetric data (such as Envisat, ALOS/PALSAR, Radarsat-2, TerraSAR-X and etc). They allow carrying out image synthesis from complex images Single Look Complex Image (SLC), calibration, calculation of different polarimetric parameters, coherency and other parameters. Such software includes the following programs: ENVI with the embeddable SARScape module; GAMMA Software; Geomatica 2012; ScanEx Image Processor; NEST; PolSARPro; DORIS.

The review of the software for radar image processing. We conducted a literature review and selected four commercial programs and four free programs described as the best representatives of the class. The given software has modular structure that enables functionality extension. Practically all of the programs have a polarimetry module which can process radar images received in different polarizable modes, that allows generating a full polarizable matrix.

SARscape (ENVI environment) allows complex processing of radar data. This building block software supports modern radar data. A complex of multifunction modules allows processing of data of the radar shooting executed by a radar with the synthesized aperture (SAR). Today SARscape takes the leading position among the software products intended to process and analyze radar data. SARscape for ENVI provides the maximum support to the existing radar sensors: ENVISAT ASAR, Radarsat-1,2, TerraSAR-X/tanDEM-X and the group of CosmoSkyMed 1-4 satellites.

SARscape standard configuration allows the following operations with radar images: focus, import, a division of comprehensive data into the amplitude and phase, automatic snapshot of one and the same territory for different dates, incoherent accumulation, filtering of speckle noise on single images and multi-temporal series of images [1].

GAMMA is a modular program for interferometric SAR data processing. GAMMA software supports multicore processors, which increases the speed of calculation depending on the number of CPU cores. Geocoding of radar data is available as part of a separate module GEO. The program is written in the ANSI C language which was selected for fast and effective processing of big data sets. Modern algorithms are used in the program for exact and fast processing on personal computers with the following operating systems: Linux (32 and 64-bit), Windows 7 (32 and 64-bit), Apple OSX 10.6-10.7 (Snow-leopard, Lion) [2]

The program contains a tool kit to use the time response and spatial characteristics received from certain local reflectors for the purpose of making dynamics cards of deformation and change of heights and the relative atmospheric time delays.

Geomatica 2012 allows all levels of processing of space and aero photos. Geomatica consists of a set of tools for the remote sensing of the Earth surface, digital photogrammetry, the spatial analysis, mosaics and