
THE RESEARCH INTO THE SPECIALIZED COMPUTER CLASSES ORGANIZATION IN HIGH EDUCATIONAL INSTITUTIONS (CAD/CAM/CAE-TECHNOLOGIES SPECIALIZED CLASS)

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The major direction of researches in the field of the use of information technologies in science is *studying the problems of specialized computer classes organization in higher educational institutions*. Over the last 15 years prompt development of computer technologies and software stimulated the computerization of scientific researches, especially in the field of industrial modelling and design. At Nizhny Novgorod State Technical University *researches were carried out* at the computer centre of Automation and Mechanical Engineering Technologies faculty. On the basis of it the specialized computer class of CAD/CAM/CAE-technologies was organized. The choice of software was defined by the specificity of the faculty: T-Flex, TechnoPro, Cimatron, ADEM, ANSYS, Euler. T-Flex and TechnoPro systems gained particular popularity among the teachers and post-graduate students of the Machine-Building Faculty.

T-Flex system includes the whole complex of the integrated software which deals with the automation of design and technological preparation of manufacture and is used in dissertations and researches when the following problems are solved:

- In CAD (Computer Aided Design) sphere: 2D and 3D modelling with the use of the newest technologies of parameterization, associative assemblies, dialogue management of projects; preparation of design documentation (drawings, specifications, etc.) according to all Russian standards.

- In CAM (Computer Aided Manufacturing) sphere: technological preparation of manufacture, preparation of the programs for computer-controlled machines and testing of the programs by machining imitation.

- In CAE (Computer Aided Engineering) sphere: final-element analysis. Visualization of load stress and structure deformations. Calculations of strength, dynamic and kinematical analyses. Calculations of tooth gearings, springs (Quick Calc DOS was used before for the calculation of strength and shaft hardness).

- In TDM/PDM (Product Data Management) sphere: technological preparation of manufacture, the creation of technological, standard and estimate documentation, projects and technical document use management.

Computer Design of Metal-Cutting Machines and Tools department has shown the *greatest interest in T-Flex system*. Post-graduate students of the department are working out the managing program for computer-controlled machines (CCM) using T-flex CCM. This system is remarkable for through parameterization. There is an opportunity to change parametrically the drawing of a detail in T-flex CAD system and to receive automatically the change in the managing program. The specialized modules for the work with tools and postprocessors are included in the program. [1]

TechnoPro System contains all necessary means for technological processes design, including automatic selection of equipment, carrying out calculations and data selection from the tables. It provides operational technology design including the following operations: procuring; mechanical and thermal processing; covering, metalwork, technical control, assembly, punching, welding and others. The system forms operational, route-operational and route technological cards, control cards, equipment, materials and accessories lists, title pages and other technological documents. This *system is applied* by post-graduate students of Mechanical Engineering Technology department *in the new techniques of technological processes design*. [2]

T-Flex and TechnoPro Systems *are widely introduced into educational process as well*. Third-year students of the above faculties master T-flex when studying Automated Manufacture Principles and Computer Graphic Modelling. Fifth-year students use these packages in Computer Technologies in Design and Systems of the Automated Technological Processes Design. Fourth-year students base their baccalaureate work on T-Flex.

In the specialized computer class the integrated system of kinematical and dynamic analysis T-flex Euler is presented. Its basis is the combination of T-flex geometrical modelling and Euler, the specialized complex of the dynamic analysis of multi component

mechanical systems. Euler is used in products design, carrying out scientific and applied researches, and also in training. The program complex allows to get reliable information about structure deformation at the work load moment even on early design stages.

ANSYS program is of special interest, as it is able to make final-element analysis: simple linear static as well as complex nonlinear dynamic (non-stationary) one. The advantage of the program is visualization of modelling results and structure strength analysis.

The researches which have been carried out in Russian High educational institutions have confirmed the tendency to the creation of specialized computer classes.

For example, in Irkutsk State Technical University there is a computer class of 25 workstations for the students and teachers of Architectural faculty, who specialize in Architecture and Architectural Environment Design. It is equipped with graphic packages AutoCAD-2002, 3D Studio V4.0, 3D VIZ V3.0. The class of tool means programming is organized for the students and teachers of Cybernetic faculty. It consists of 25 workstations and is equipped with Borland Pascal 7.0, Borland C++ for DOS, Borland Pascal 7.0 for Wind, Delphi, applied ON MathCAD 7.0 and Statistic 6.0.

At St.-Petersburg State University at Mathematics and mechanical faculty the class of parallel calculations (8 workstations) is detached.

At Grodno State University at the faculty of Productions Automation a specialized class is organized which is equipped with industrial controllers of the management of thermal modes of materials heating in furnaces.

There are two specialized classes of computer drawing and computer optics at the faculty of Technical Cybernetics of Samara State Space University.

The faculty of Political Science and Sociology of Ural State University has organized a specialized class with multimedia courses for teaching English (English Discoveries).

The specialized computer classes are separated from usual computer classes of professional preparation with standard software. It has some advantages and gives various specialized software to the students, post-graduate students and teachers according to the specificity of the faculty. Such classes are the base for scientific researches.

Literature

1. *The license version*. T-flex Documentation. M.: "TOP-SYSTEMS", 2002.
2. *The license version*. TechnoPro Documentation. M.: "TOP-SYSTEMS", 2002.