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INFORMATION - COMMUNICATION TECHNOLOGY IN A SCIENTIFIC - RESEARCH ACTIVITY

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Abstract. In the work the basic essence of the use of information and communication technologies in science. Reveal these features on the example of studying the physical properties of rare-earth metals dodecaborides YB_{12}, TbB_{12}, DyB_{12}, HoB_{12}, ErB_{12}, TmB_{12}, YbB_{12}, LuB_{12}, ZrB_{12}.

Key words: information communicative technology, computers, computer software, mechanical characteristics, dodecaborides rare earth metals.

One of the main areas of the new millennium can be considered active introduction to all without exception, human activities of information technology and computers.

Information Communicative Technology (ICT) - a combination of procedures that implement the function of collecting, producing, stockpiling, storage, processing, analysis and transmission of information in the organizational structure with the use of computers, or, in other words, the set of processes of circulation and processing of information and description of these processes .

Scope of the new information technologies and communications methods developed very diverse. It includes various aspects, from providing simple functions of official correspondence to the system analysis and maintenance of complex tasks and decision support solutions. In turn, the conceptual stage in the development of information technology is the creation and use of expert systems in economics, education and public administration [1, 2].

Information and communication technologies are widely used in educational and pedagogical process during teaching, learning and knowledge control for distance learning, educational assessment, testing [3].

Enormous potential of information and communication technologies in the research work. Where, as in the Internet, you can find a list of magazines and the magazine itself with scientific article of your interest, publications, research, thesis.

Only information and communication technologies allow the researcher to carry out fairly easily, quickly scientific information regarding the most diverse scientific problems, make literature review, to obtain information from various archives.

Enormous potential of ICT modeling processes, modeling the properties of various materials to create virtual laboratories web - technology, virtual and physical processes.

ICTs allow scientists to establish personal contacts, correspondence and information exchange with colleagues, participate in scientific conferences online, to receive information from digital libraries.

Information and communication technologies in science can solve a variety of graphic, design and research operations quite easily, quickly and economically [4].

The above can be represented by a number of specific examples of research in solid state physics, for example.

In the experimental determination of mechanical constants dodecaborides rare earth metals with a structure of UB_{12} we are faced with the problem of shortage of background information in the problem of oscillations of prismatic beam with a compact mass at the end when calculating the elastic modulus E.

For a cantilever beam of length l sweatshop mass m in a concentrated mass at the free end of Mp we have received regarding the frequency equation eigenfrequencies λ_n, EI flexural and shear stiffness $G\omega$.

$$f(\lambda_n, EI, G\omega) = \left(a_{22}^{(n)} - a_{20}^{(n)} a_{02}^{(n)} / a_{00}^{(n)}\right)\left(a_{33}^{(n)} - a_{31}^{(n)} a_{13}^{(n)} / a_{11}^{(n)}\right) -$$

$$-\left(a_{32}^{(n)} - a_{30}^{(n)} a_{02}^{(n)} / a_{00}^{(n)}\right)\left(a_{23}^{(n)} - a_{21}^{(n)} a_{13}^{(n)} / a_{11}^{(n)}\right) = 0 \qquad 1)$$

where

$$j_n = \lambda_n \left[-\frac{m}{2G\omega} + \sqrt{\left(\frac{m}{2G\omega}\right)^2 + \frac{m}{\lambda_n^2 EI}} \right]^{1/2} ; \ \mu_n = \lambda_n \left[\frac{m}{2G\omega} + \sqrt{\left(\frac{m}{2G\omega}\right)^2 + \frac{m}{\lambda_n^2 EI}} \right]^{1/} \quad 2)$$

$$a_{00}^{(n)} = 1 - \frac{EI}{G\omega} j_n^2; \quad a_{02}^{(n)} = 1 + \frac{EI}{G\omega} \mu_n^2; \ a_{11}^{(n)} = j_n a_{00}^{(n)}; \quad a_{13}^{(n)} = \mu_n a_{02}^{(n)};$$

$$a_{20}^{(n)} = j_n^2 ch(j_n l) a_{00}^{(n)}; a_{21}^{(n)} = j_n^2 sh(j_n l) a_{00}^{(n)};$$

$$a_{22}^{(n)} = -\mu_n^2 cos(\mu_n l) a_{02}^{(n)}; \quad a_{23}^{(n)} = -\mu_n^2 sin(\mu_n l) a_{02}^{(n)};$$

$$a_{30}^{(n)} = j_n^3 sh(j_n l) + \frac{M_p \lambda_n^2}{EI} a_{00}^{(n)} ch(j_n l); a_{31}^{(n)} = j_n^3 ch(j_n l) + \frac{M_p \lambda_n^2}{EI} a_{00}^{(n)} sh(j_n l); \quad 3)$$

$$a_{32}^{(n)} = \mu_n^3 sin(\mu_n l) + \frac{M_p \lambda_n^2}{EI} a_{02}^{(n)} cos(\mu_n l); a_{33}^{(n)} = -\mu_n^3 cos(\mu_n l) + \frac{M_p \lambda_n^2}{EI} a_{02}^{(n)} sin($$

There are two possible problems - forward and reverse.

For numerical solution of direct and inverse problems for the frequency equation developed computer program in Pascal ABC.

Solution of the frequency equation (1) with respect to λ_n (direct problem) is performed using the *consolL*. The same program is used to check found using the assumed values *consolE* modulus E (the inverse problem).

Table 1 shows the number of results obtained when testing software and consolL consolE.

Specific values of the elastic modulus (Young's modulus) were 240, 198, 178, 165, 210, 230, 230, 182 GPa, respectively, for YB_{12}, DyB_{12}, HoB_{12}, ErB_{12}, TmB_{12}, YbB_{12}, LuB_{12}, ZrB_{12}.

Table 1

Results of testing programs

Weight and size of the sample parameters: l = 0.1; b = 0.01; h = 0.002; ro = 7800; m = 0.156; mu = 0.3; Om = 1.66666666666667E-5; I = 6.66666666666667E-12; Mp = 0.0312	
Program consolL for $E = 2\cdot10^{11}$ Pa	program consolE for λ_n
λ_1 =338.592612838745	E_1=200000002845.764
λ_2 =4633.94769439697	E_2=199999989706.039

λ_3=14714.9616409302	E_3=199999987802.506
λ_4=30469.3702102661	E_4=199999993706.055
λ_5 =51815.8680130005	E_5=199999981845.703

In a similar manner we solved the issue the results of calculations of the electronic structure of rare earth metals dodecaborides. Only the methods of computer technology have allowed us to solve the matrix 2-9 orders and get your own number, vector which yielded values of the energy levels and coefficients of the basis functions of molecular orbitals. Last possible to create energy spectrum dodecaborides rare earth metals and predict their metallic properties (YB_{12}, LuB_{12}, ZrB_{12}) and semiconductor (YbB_{12}), which was later confirmed experimentally [5,6].

Conclusions. Only information and communication technologies can fully ensure the successful implementation of a scientific research from its inception to completion.

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FATIGUE RESISTANCE STAMPED ON THE GRIND AND PRESS SHELL PLATE ALLOY ЭИ 878

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The paper presents the results of a study made on the fatigue properties of a hydraulic press and sheet-metal hammer sheet corrugated panels alloy ЭИ 878. Discussion of results of analysis made on the basis of a deformed condition and changes in the structural and mechanical characteristics of the material. Metal panels stamped on the press elastic medium, showed the best results on the fatigue life compared with panels made for the hammer in a metal die.

Introduction

The service conditions of sheet-convolution boards which are used in aircraft are characterized by permanent loading with periodically raise the load level and corresponds to the area of low-cycle fatigue [1].

Under technology development in the control stage the fatigue tests of metal of shaped articles is not laid of fatigue .Decision making about starting the technology into serial production based on the results of full-scale tests.

The practice of bench test and exploitation shows that the fatigue damage can occur where the rift exit on a board flat surface, that is where there is practically no