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MODELING THE OPERATION OF A THERMOMETER IN LABVIEW

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Annotatsiya

Fizika va elektronika ta'limi soxalarida axbarot va kompyuter texnalogiyalaridan foydalanilgan holda fizikaviy jarayonlarni va tajribalarni kompyuterda modellashtirish hisoblanadi. Fizik jarayonlarni modellashtirish o'quvchilarga dars o'tish jarayonida ko'pgina qulayliklar yaratadi, fizik jarayonlarni oydinlashtiradi. Fizikaviy jarayonlarni namoyish etish va ixtiyoriy marta takrorlab ko'rsatish imkoniyatini yaratadi. Laboratoriya ishlarini virtual loyihalash usullari sanoat korxonalarida, shuningdek, barcha ta'lim yo'nalishlarida "LabVIEW" dasturida modellashtirish jarayonlari o'rganildi. "LabVIEW" dasturida o'quv jarayonlarida virtual laboratoriya loyihalash texnologiyasidan foydalanish imkoniyatlari o'rganildi.

Kalit so'zlar: axborot texnologiyalari, animatsiyalar, dinamik modellar, modellashtirish, axborot texnologiyalari.

Abstract

Computer modeling of physical processes and experiments with the use of scientific and computer technologies in the fields of Physics and electronics education is considered. Modeling of physical processes creates for students a lot of convenience in the course of classes, clarifies physical processes. Provides the ability to display physical processes and repeat optional times. Methods of virtual design of laboratory works and modeling processes in the "LabVIEW" program were studied in industrial factories, as well as in all educational areas. The possibilities of using virtual laboratory design technology in educational processes were studied in the "LabVIEW" program.

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Keywords: information technologies, animations, dynamic models,modeling, information technologies.

Аннотатсия:
Рассматривается компьютерное моделирование физических процессов и экспериментов с использованием научных и компьютерных технологий в области физики и электроники. Моделирование физических процессов создает для студентов массу удобств в ходе занятий, уточняет физические процессы. Предоставляет возможность отображения физических процессов и повторения дополнительных раз. Методы виртуального проектирования лабораторных работ и моделирования процессов в программе «LabVIEW» изучались на промышленных предприятиях, а также во всех образовательных областях. Изучались возможности использования технологии виртуального проектирования лабораторий в учебных процессах в программе «LabVIEW».

Ключевые слова: информационные технологии, анимация, динамические модели, моделирование, информационные технологии.

Introduction

One of the developing areas of application of information and computer technology in physics education is the computer modelling of physical processes and experiments. Computer models promote these traditional and unconventional lesson processes, create many reliefs on the teacher's course, and make it easy to understand all physical processes. It provides opportunities to show laboratory work to students by displaying it on the screen and repeating it several times [1],[2], [4].

analysis and results.

The efficiency of the application of Information Technology in the educational process of educational institutions, the connection with the content, form and methods of teaching today, can be determined by the following goals. If technical colleges, engineering institutions, manufacturers, chemical institutions and technological uiversities use programs, such as Multisim, Proteus, EdrawMax, PhET and LabVIEW with the flowcharts 2D and 3D, teachers who is teaching physical laws in real life will have a number of advantages:

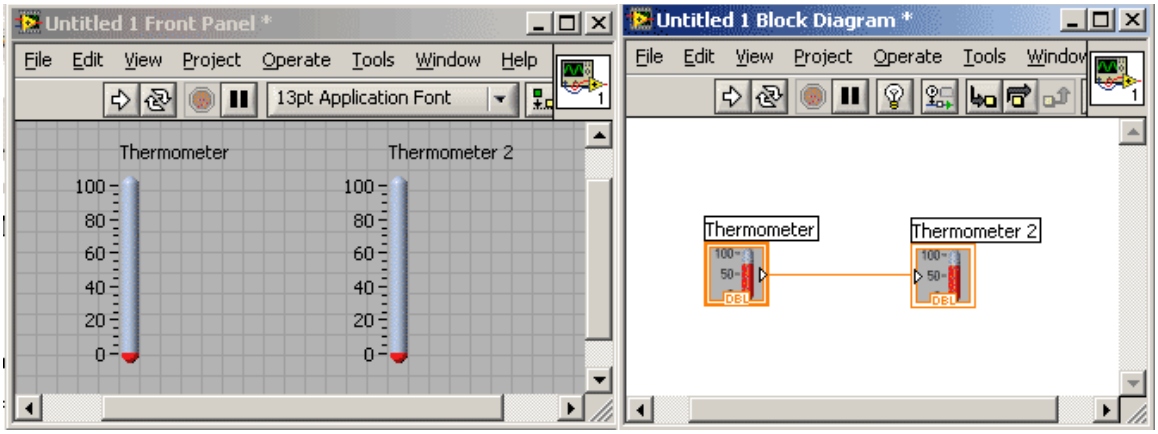
Save time;

The level of "accessibility" of students in the educational process;
Implementation of a single approach of students;
The degree of "mechanisation" of pedagogical methods.

Let's look at the possibilities of using the application technology “LabVIEW” which is intended for conducting physical experiments in the educational processes. LabVIEW (Laboratory Virtual Instrument Engineering Workbench) is a complex software created by a company National Instruments (USa). It uses the intuitive graphical programming language G, which does not require knowledge of other traditional programming languages to learn. Because the LabVIEW program has a wide range of capabilities in performing calculations and mathematical modelling, it can easily compete with popular mathematical complex programs such as MaTHLaB, MathCaD, Mathematica, MaPLE. The LabVIEW program consists of two panels which are named as front panels and back panels. To start the program, we select the Windows show panel from the menu to switch to the structural scheme from the front panel. When creating a new object on the front panel, select the Controls palette “Windows show controls palette”. a rectangular icon will be created in the object created in the front panel, and we can enter the text we want into it. We can continue the work in this order [3], [5], [6],[8].

If we consider the task of outputting the values of the temperature and its control elements to the indicator, which we are familiar with in our daily life, using the LabVIEW program.

1. To do this, select the Numeric command from the Modern section on the front panel and select the Thermometer indicator from it, take two Thermometer indicators and place them on the front panel.
2. We take one of the indicators as a control element. To do this, select the Change to Control item from the front panel and mark it as a control element.
3. We connect the indicators to each other with the help of the mouse cursor and check that the indicators Run Continuosly are usable.
4. When we change the values of the controls using the mouse, the value on the scale of the Thermometer 2 indicator changes.



Picture 1. Thermometer indicator control.

5. We place two indicators on the front panel of the Thermometer from the Modern Numeric section to change the temperature from the Celsius unit to the Fahrenheit unit.
6. Let's call the thermometer indicators "C" Celsius and "F" Fahrenheit.
7. Select the "C" Celsius indicator as a control element.
8. We select Multiply and add functions from the arithmetic functions section of the function palette, Programming Numeric, and place the selected functions in the chart block.

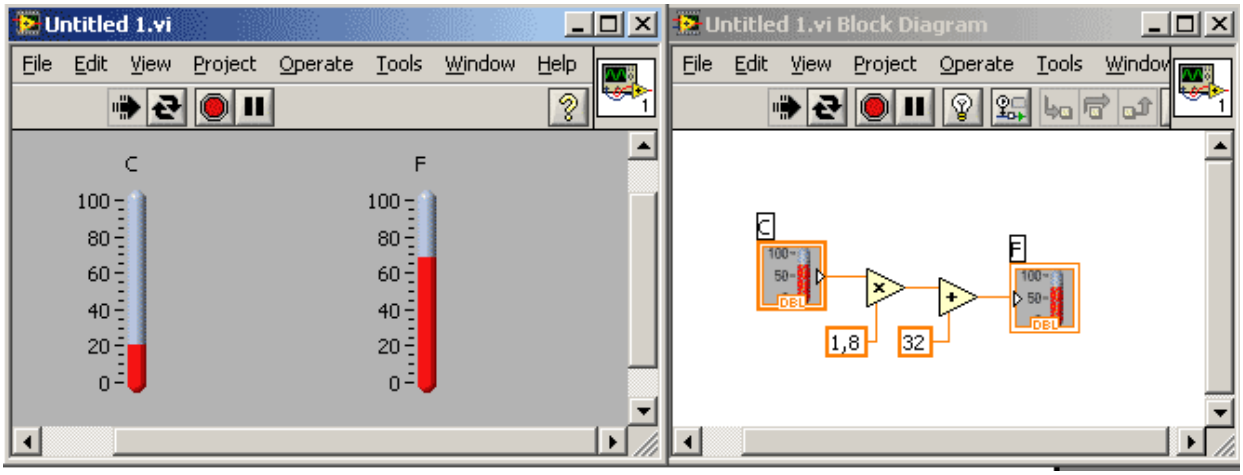


Figure 2. Schematic of the front and back panel software that converts Celsius to Fahrenheit.

9. We create a digital constant in the corresponding input of the multiplication function. To do this, select Create Constant from the menu and create a command to multiply by 1.8 with the Celsius indicator.
10. We also select the Fahrenheit constant from the Sozdat constant menu and create a command to add the value 32 to it.
11. Run the program by pressing the Run Continuously button.

Through this work, we looked at the assembly and execution of a program that converts Celsius temperatures to Fahrenheit temperatures.

When using virtual laboratories, virtual selection of the necessary equipment, creation of virtual experimental stands, search for modeling of parameters given in the physical process, calculation and construction of graphs are also carried out. Laboratory equipment and software-methodological tools of this type of practice select the object individually, adjust its indicators (parameters), set the given scheme and experimental modes, and analyze the experimental results [7], [10].

Conclusion

We have shown here that without cancelling traditional methods of teaching physics, chemistry and all science subjects it is possible to develop teaching methods by modern technologies and software programs. one of them is creating virtual labaratory works and programming physical processes and to use them productively during the lessons. Textbooks, methodical manuals, and a number of scientific studies that can be used in physics education were analysed, and it was proved that one of the important factors is the improvement of physics education on the basis of information technology [9].

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