AXBOROT TEXNOLOGIYALARI VA DASTURIY VOSITALAR ASOSIDA MASHG'ULOTLARNI TASHKIL QILISH METODIKASI

МЕТОДИКА ОРГАНИЗАЦИИ УРОКОВ НА ОСНОВЕ ИНФОРМАЦИОННЫХ ТЕХНОЛОГИЙ И ПРОГРАММНОГО ОБЕСПЕЧЕНИЯ

METHODOLOGY OF ORGANIZATION OF LESSONS BASED ON INFORMATION TECHNOLOGIES AND SOFTWARE

Jumayev Nusrat Amonovich. *(Muxammad al-Xorazmiy nomidagi Toshkent axborot texnologiyalari univesiteti Qarshi filiali)*
M.B.Rustamova *(Muxammad al-Xorazmiy nomidagi Toshkent axborot texnologiyalari univesiteti Qarshi filiali)*
Джумаев Нусрат Амонович*. ((Каршинский филиал Ташкентского университета информационных технологий имени Мухаммада ал-Хоразмий)*

Рустамова Малика Баходировна *((Каршинский филиал Ташкентского университета информационных технологий имени Мухаммада ал-Хоразмий))*

Jumayev Nusrat Amonovich*. ((Karshi branch of Muhammad al-Khwarizmi Tashkent University of Information Technologies))*

Rustamova Malika Bakhodirovna *((Karshi branch of Muhammad al-Khwarizmi Tashkent University of Information Technologies))*

ANNOTATSIYA

Ushbu maqolada ayirim fizikaviy masalalarni yichishda dasturlash tillaridan, jumladan C^{++} dasturlash tilidan foydalanishning amaliy mashg'ulotlar jarayonida qo'llanilgan ayirim usullari hamda $DevC^{++}$ dasturlash tilidan grafiklar hosil qilishda foydalanish orqali fizikadan amaliy mashg'ulotlarni tashkil qilishning usullari keltirib o'tildi.

Kalit so'zlar: *Dastur, grafik, dastur kodi, didaktika, texnologiya, innovatsiya.*

ANNOTATION

This article discusses some of the programming languages used to solve some physical problems, including the C ++ programming language, and how to organize practical physics lessons using the DevC ++ programming language to create graphs.

Keywords: *Program, graphics, program code, didactics, technology, innovation.*

АННОТАЦИЯ

В данной статье будут рассмотрены некоторые методы, применяемые в процессе практических занятий по физике с использованием

языка программирования C++ для решения некоторых физических задач, а также методы организации практических занятий по физике с использованием языка программирования DevC ++ для создания графиков.

Ключевые слова: *программа, график, программный код, дидактика, технология, инновации.*

Keyingi yillarda kompyuter texnologiyalarining rivojlanishi bilan bog‘liq holda dars mashg‘ulotlarni tashkil etishning yangi usullari shakllanmoqda. Ulardan, keng foydalanayotgan amaliy ishlardan biri maxsus dasturlar yordamida kuzatilishi qiyin bo‘lgan fizik jarayonlarni animatsiyalar, vertual tajribalar va taqdimotlar vositasida ko‘rgazmali tushuntirishdir. Jumladan, fizika fanining, ma’ruza laboratoriya va amaliy mashg‘ulotlarida yangi zamonaviy texnologiyalar va asbob-uskunalar ya’ni, raqamli o‘lchash asboblari, vertual laboratoriyalar, animatsiyalar, elektron darsliklar, hamda ular asosidagi multimediya vositalardan foydalanish ta’lim sifatiga katta ijobiy ta’sir ko’rsatadi.

Fizika fanini o‘qitishga kompyuter texnologiyalarini va dasturiy ta’minotlarni qo‘llash va ular asosidagi amaliy mashg’ulotlarni tashkil qilish pedagogik va psixologik nuqtai nazardan ham katta ahamiyatga ega. Bundan tashqari “Fizika” va “Dasturlash” fanlari orasida o’zaro bog’liqlikni, ya’ni fanlararo integratsiyani ta’minlaydi.

Talim sifatini oshirishga qaratilgan so’ngi isloxotlar shuni ko’rsatadiki, sifatni oshiruvchi har qanday eng yangi pedagogik texnologiyalar, innovatsiyalar va fanlararo integratsiyalar zamonaviy ta’limda dolzarb ahamiyat kasb etadi.

Zamonaviy ta'limda fanlarni o’qitishda ularning integratsiyasini ta’minlashga yetarli e’tibor berilmay kelmoqda. Oliy ta’lim o’quv rejalaridagi fizika, elektrotexnika, matematika, informatika va dasturlash kabi fanlar ham tizimli o’zaro bog’liqlikni ta’minlamagan holda o’qitilmoqda. Muammoni bartaraf etishga qaratilgan tadbirlar esa tegishli o’quv rejalarida ushbu fanlarni o’qitishning vaqt bo’yicha muvofiqlashtirilishi yoki fanlar mazmunini qisman uyg’unlashtirishga oid tadbirlar bilan cheklanmoqda. Uni tubdan hal qilish uchun esa, talabalar egallaydigan bilimlari yuqori sifat darajasini ta’minlovchi o’quv fanlari integratsiyasining zaruriy shart-sharoitlari, shakl, mazmun va vositalarini ishlab chiqish talab etilmoqda.

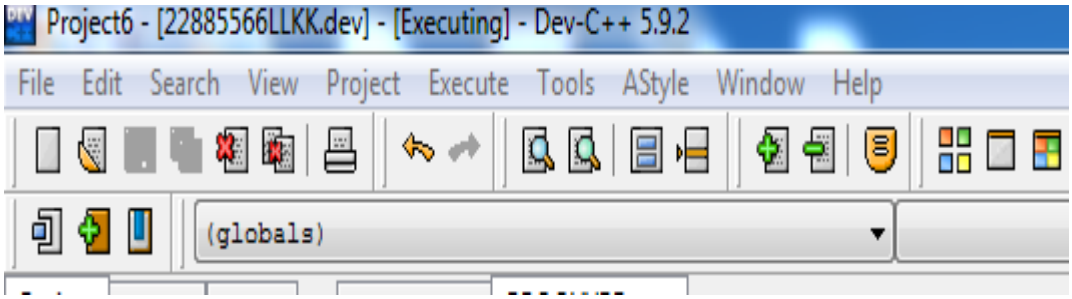
Zamonaviy didaktika o’quv fanlarini integratsiyalashga bir qancha yondashuvlarni taklif qiladi, biroq hali bu jarayonning umume’tirof etilgan mazmuni, shakl va vositalari yaratilgan emas.

Ushbu maqolada “dasturlash” va “fizika” fanlarining integratsiyasi sifatida ayirim fizikaviy masalalarni yichishda dasturlash tillaridan, jumladan C^{++} dan foydalanishning amaliy mashg’ulotlar jarayonida qo’llanilgan ayirim usullari

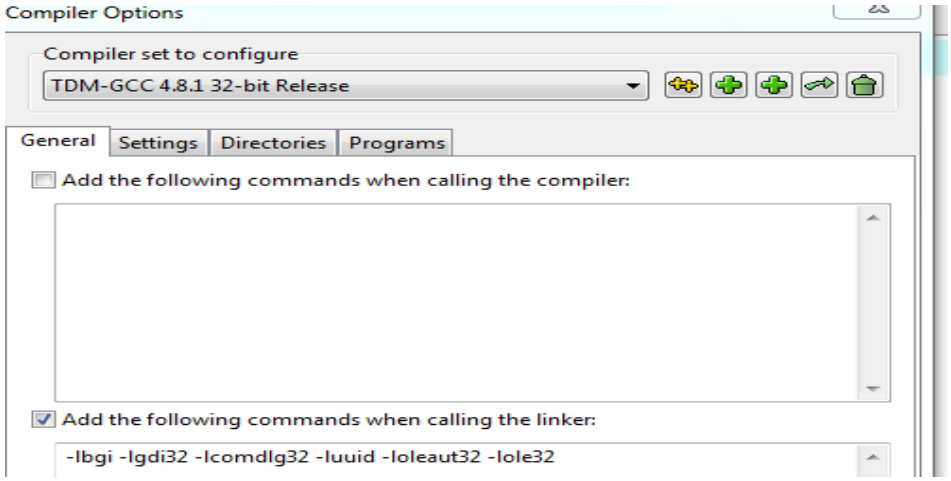
hamda DevC++ dasturlash tilidan grafiklar hosil qilishda foydalanish usullari keltirib o'tildi.

DevC++ dasturlash tilidan grafiklar hosil qilishda foydalanish uchun avvalo dasturni grafik rejimda o'tkazish uchun sozlash lozim. Buning uchun DevC++4.9.9.2 versiyadan foydalanish kerak va sozlash quyidagicha ketma-ketlikda amalga oshiriladi: [1]

1. **graphics .h va libbgi.h** fayllarini yuklab oling;
2. **graphics .h** faylini C:\Dev-Cpp\include\katologiga ko'chiring;
3. **libbgi.h** faylini C:\Dev-Cpp\include\katologiga ko'chiring;
4. Dev-C++ ni ishga tushirish va **Tools** bo'limidan **Compiler options** bo'limini tanlang;



Add these command to the linker command line ga bayroqcha o'rnatilib quyidagi satr yoziladi:



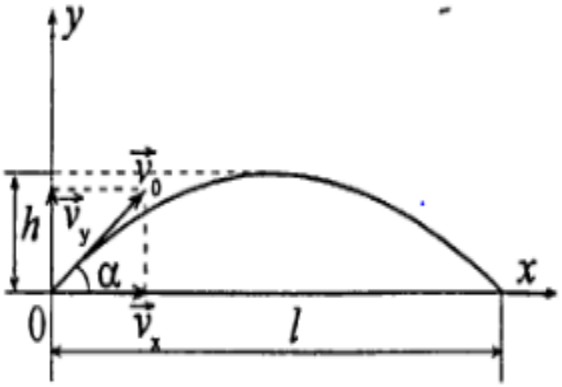
1-misol uchun masalaning qo'yilishi quyidagicha bo'lsin:

Koptok gorizontga nisbatan 40^o burchak ostida 10 m/s tezlik bilan uloqtirildi. To`p qanday balandlikka ko'tariladi? U uloqtirilgan joydan qancha masofada yerga tushadi? U qancha vaqt harakatda bo`ladi? [3]

Yechish:

Yo'lning vertikal tashkil etuvchisi: $S_y = (v_0 sin\alpha) * t - g * t^2/2$ - (1) , tezlikning vertikal tashkil etuvchisi esa: $v_y = v_0 sin\alpha - gt/2$ - (2) Yo'lning gorizontal tashkil etuvchisi: $S_x = (v_0 cos\alpha) * t$ – (3). t=t_1 bo'lganda $S_y = h$, $v_y = 0$ tengliklar o'rinli. Ikkinchi tomondan, (2) dan quyidagiga ega bo'lamiz: $v_0 sin\alpha = gt_1$- (4). (1) dan h = $(v_0 sin\alpha)$t-$gt^2_1/2$ – (5), (4) dan t_1 ni topamiz: $t_1 = v_0 sin\alpha/g$, buni (5) ga qo'yamiz: h=$\frac{(v_0{}^2 sin^2\alpha}{g}$-$\frac{g v_0{}^2 sin^2\alpha}{2g^2}$=5 m; t=$2t_1$, bo'lganda $S_x = l$, shunda to'liq uchish vaqti: t=$\frac{2v_0 sin\alpha}{g}$=1,5 s, (3) tenglamadan: $l = v_0 cos\alpha$=10m.

Ushbu usulda olingan grafigi quyidagicha:

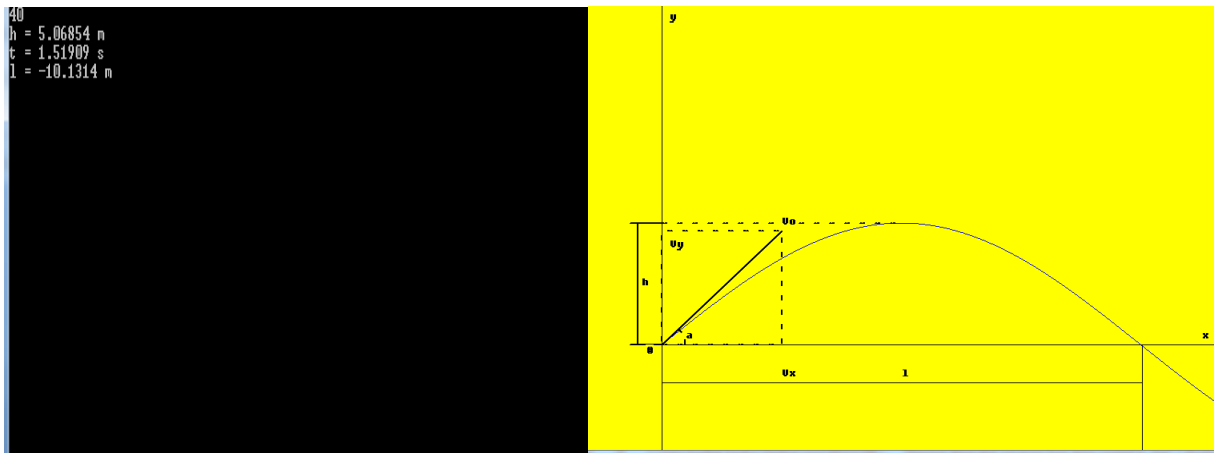


1-rasm. Analitik yichim

Endi ushbu masalani C^{++} da yichishning va grafigini tuzishning dastur kodini keltiramiz: [2]

```
#include <iostream>
#include <graphics.h>
#include <conio.h>
#include <math.h>
using namespace std;
int main(){
  float V0 = 10, h, t, g = 9.81, pi = 3.1415, l;
  float a = (2 * pi) / 9;
  a = a * 180 / pi;
  cout << a << endl;
  h = (V0 * V0 - pow(sin(a),2)) / (2 * g);
  t = (2 * V0 * sin(a)) / g;
  l = (V0 * cos(a)) * t;
  cout << "h = " << h << " m" << endl;
  cout << "t = " << t << " s" << endl;
  cout << "l = " << l << " m" << endl;
  initwindow(800, 600);
  setbkcolor(BLUE);
  cleardevice();
  setcolor(0);
  line(100, 0, 100, 600);
  line(100, 450, 800, 450);
  line(100, 500, 700, 500);
  line(700, 450, 700, 600);
  setlinestyle(5, 0, 2);
  int x, y;
  float v0 = 800; g = 10, pi = 3.1415;
    for(int i = 0; i < 800; i++){
    x = 100 + i;
    y = 450 - (2 * v0 * sin((i / 3.32) * pi / 180))/ g;
    putpixel(x, y, 1);
    delay(10);
  }
line(100, 450, 250, 300);
  line(100, 450, 250, 300);
  line(60, 290, 100, 290);
  line(60, 450, 100, 450);
  line(70, 290, 70, 450);
  setlinestyle(4, 59, 2);
  rectangle(100, 450, 250, 300);
line(100, 290, 400, 290);
  outtextxy(75, 360, "h");
  outtextxy(110, 10, "y");
  outtextxy(775, 430, "x");
  outtextxy(250, 280, "Vo");
  outtextxy(110, 310, "Vy");
  outtextxy(80, 450, "0");
  outtextxy(130, 430, "a");
  outtextxy(250, 480, "Vx");
  outtextxy(400, 480, "l");
  arc(100, 450, 0, 45, 30);
  getch();
  closegraph();
}
```

Ushbu dasturni ishga tushirib quyidagi natijalarga ega bo'lamiz:



2-rasm. C++ dasturi orqali olingan natijalar

Ko’rinib turibdiki analitik usulda olingan yichimlardan hamda grafikdan C^{++} dasturi orqali olingan yichim va grafik diyarli farq qilmaydi.

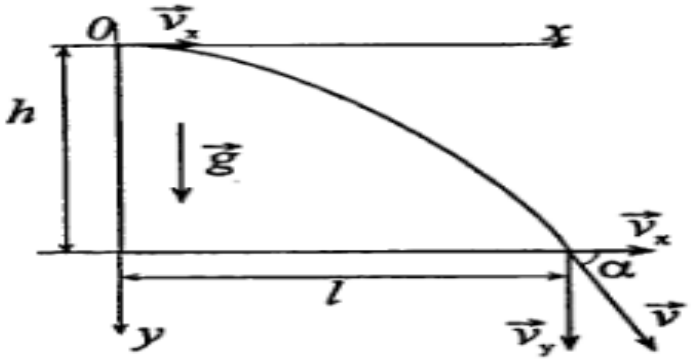
2-masala quyidagicha qo’yilgan bo’lsin:

Balandligi h=25m bo`lgan minoradan $v_x = 15\ m/s$ tezlikda gorizontal ravishda tosh uloqtirildi. Bu tosh qancha vaqtgacha harakatda bo`ladi? Minora poydevoridan qancha masofada yerga tushadi? U qanday tezlik bilan tushadi? Yirga tushish nuqtasida gorizont bilan toshning trayektoriyasi qanday burchak xosil qiladi? [3]

Yechish:

Yo’lning vertical tashkil etuvchisi: $S_y = h = gt^2/2$ – (1), gorizontal tashkil etuvchisi esa: $S_x = l = v_x t$ (2), (1) dan: t=$\sqrt{\frac{2h}{g}}$ =2,26 s, (2) dan: $l = v_x t$=33,9. Toshning tezligi: $= \sqrt{{v_x}^2 + {v_y}^2}$, Tezlikning vertical tashkil etuvchisi: $v_y = gt$. Bunga ko’ra $v = \sqrt{{v_x}^2 + (gt)^2}$ va quyidagi

grafikdan ko’rinadiki: $cos\varphi = \frac{v_x}{\sqrt{{v_x}^2+(gt)^2}}$=0,91 $\varphi = 91°$

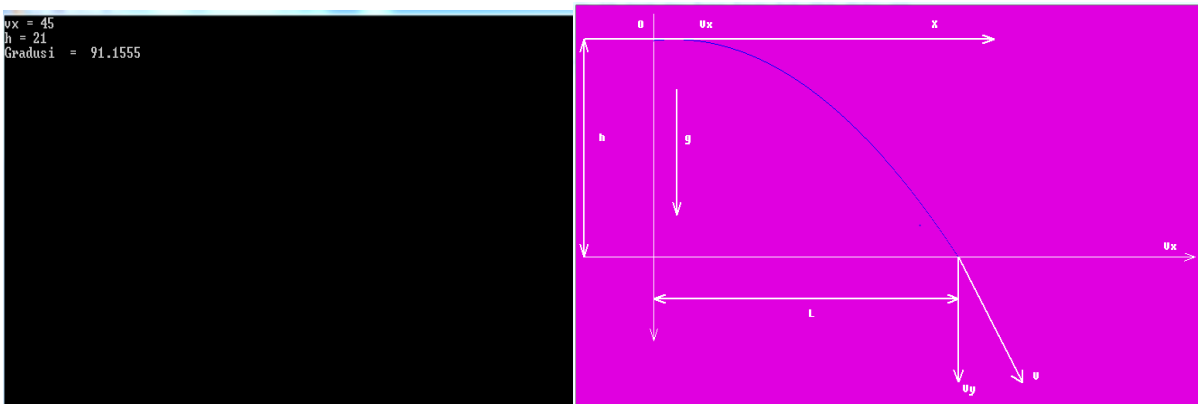


3-rasm. Analitik yichim

Endi ushbu masalani C^{++} da yichishning va grafigini tuzishning dastur kodini keltiramiz: [1]

```
#include<iostream>
#include<graphics.h>
#include<conio.h>
#include<math.h>
using namespace std;
int main(){
 float w, l, f,  t, vx, h, g = 9.81,
pi=3.1415;
 cout << "vx = ";  cin>>vx;
 cout << "h = "; cin >> h;
 t=sqrt((2*h)/g);
 w=vx/sqrt(pow(vx,2)+g*g*t*t);
 f=w*100;
  cout <<"Gradusi  =  "<<f << endl;
 initwindow(850, 600);
 setbkcolor(BLUE);
 cleardevice();
 setcolor(15);
  line(100, 10, 100, 400);
 line(10, 300, 800, 300);
  line(800,300,785,295);
 line(800,300,785,305);
 line(100,400,105,385);
 line(100,400,95,385);
 //line(100,480,600,480);
 //line(100,570,600,570);
 setcolor(RED);
 int x, y;
 g = 0.75;
 for(int t = 0; t < 395; t++){
  setlinestyle(0,1,2);
  putpixel(x, y, 1);
  x = 100 + t;
  y = 42 - 0.1 * t + g * t * t / 390;
  putpixel(x, y, 2);
  delay(10);
 }
 setcolor(15);
 line(10,40,540,40);
 line(10,40,10,300);
 line(10,40,5,55);
line(10,40,15,55);
 line(10,300,5,285);
 line(10,300,15,285);
 line(540,40,525,35);
 line(540,40,525,45);
 line(100,350,494,350);
 line(100,350,115,345);
 line(100,350,115,355);
 line(130,100,130,250);
 line(130,250,135,235);
 line(130,250,125,235);
 line(494,350,480,345);
 line(494,350,480,355);
 line(494,300,577,450);
 line(577,450,562,442);
 line(577,450,577,435);
     line(494,450,494,300);
 line(494,450,500,435);
 line(494,450,488,435);
 outtextxy(140,150,"g");
 outtextxy(490,450," Vy ");
 outtextxy(590,435,"V");
 outtextxy(20,150," h ");
 outtextxy(150,15," Vx ");
 outtextxy(450,15," X ");
 outtextxy(750,280," Vx ");
 outtextxy(70,15," O ");
 outtextxy(300,360,"L");
 getch();
 closegraph();
 return 0;
}
```

Ushbu dasturni ishga tushirib quyidagi natijalarga ega bo’lamiz:



4-rasm. C^{++} dasturi orqali olingan natijalar

Bu erda ham ko’rinib turibdiki analitik usulda olingan yichimlardan hamda grafikdan C^{++} dasturi orqali olingan yichim va grafik diyarli farq qilmaydi.

o’rnida: fizikadan mashg’ulotlar jarayoniga dasturiy vositalarni qo’llash nafaqat fanlararo integratsiyani ta’minlaydi, balki talabalarda bu ikki fanga bo’lgan qiziqishni, ijodiy va ilmiy faolligini oshirish uchun ham xizmat qiladi va bu ta’lim metodi ta’lim sifatiga ulkan ijobiy ta’sir ko’rsatadi.

ADABIYOTLAR

1. С.В. Глушаков и др. Язык программирования С++. Харьков «Фолио» 2001г.
2. Жесс Либерти, “Освой самостоятельно С++ за 21 день”, Санкт Петербург 2000г.
3. В.С.Волькенштейн. Умумий физика курсидан масалалар тўплами. -Тошкент. ”Ўқитувчи” -1969 й.
4. www.mathsoft.com
5. Nazirov E.N., Xudaybergenova Z.A., Safiulna N.X. – Mexanika va molekulyar fizikadan praktikum. – T., O‘qituvchi, 1979 y.

AXBOROT TEXNOLOGIYALARI VA DASTURIY VOSITALAR ASOSIDA MASHG'ULOTLARNI TASHKIL QILISH METODIKASI

МЕТОДИКА ОРГАНИЗАЦИИ УРОКОВ НА ОСНОВЕ ИНФОРМАЦИОННЫХ ТЕХНОЛОГИЙ И ПРОГРАММНОГО ОБЕСПЕЧЕНИЯ

METHODOLOGY OF ORGANIZATION OF LESSONS BASED ON INFORMATION TECHNOLOGIES AND SOFTWARE

Jumayev Nusrat Amonovich. *(TATU Qarshi filiali, katta o'qituvchi)*
M.B.Rustamova *(TATU Qarshi filiali, katta o'qituvchi)*
malixonbonu@mail.ru
Джумаев Нусрат Амонович. (Каршинский филиал ТУИТ, старший преподаватель)
Рустамова Малика Баходировна (Каршинский филиал ТУИТ, старший преподаватель)

Jumayev Nusrat Amonovich. (Karshi branch of TUIT, senior teacher)

Rustamova Malika Bakhodirovna (Karshi branch of TUIT, senior teacher)

ANNOTATSIYA

Ushbu maqolada ayirim fizikaviy masalalarni yichishda dasturlash tillaridan, jumladan C^{++} dasturlash tilidan foydalanishning amaliy mashg'ulotlar jarayonida qo'llanilgan ayirim usullari hamda $DevC^{++}$ dasturlash tilidan grafiklar hosil qilishda foydalanish orqali fizikadan amaliy mashg'ulotlarni tashkil qilishning usullari keltirib o'tildi.

Kalit so'zlar: *Dastur, grafik, dastur kodi, didaktika, texnologiya, innovatsiya.*

ANNOTATION

This article discusses some of the programming languages used to solve some physical problems, including the C ++ programming language, and how to organize practical physics lessons using the DevC ++ programming language to create graphs.

Keywords: *Program, graphics, program code, didactics, technology, innovation.*

АННОТАЦИЯ

В данной статье будут рассмотрены некоторые методы, применяемые в процессе практических занятий по физике с использованием языка программирования C++ для решения некоторых физических задач, а также методы организации практических занятий по физике с использованием языка программирования Dev C ++ для создания графиков.

Ключевые слова: *программа, график, программный код, дидактика, технология, инновации.*

In recent years, with the development of computer technology, new ways of organizing lessons are emerging. One of the most widely used practices is the visual explanation of physical processes that are difficult to observe using special software through animations, virtual experiments, and presentations. In particular, the use of new modern technologies and equipment in physics, lectures, laboratories and practical classes, ie digital measuring instruments, virtual laboratories, animations, electronic textbooks, as well as multimedia tools based on them, greatly affects the quality of education. has a positive effect.

The use of computer technology and software in the teaching of physics and the organization of practical classes based on them are of great pedagogical and psychological importance. It also provides interdisciplinary integration between Physics and Programming.

Recent reforms aimed at improving the quality of education show that any new pedagogical technologies, innovations and interdisciplinary integrations that improve the quality of education are relevant in modern education. Subjects such as physics, electrical engineering, mathematics, computer science, and programming are also taught in higher education curricula without providing systemic interdependence. Measures to address the problem are limited to the timing of the teaching of these subjects in the relevant curricula or to the partial harmonization of the content of the subjects. To solve it radically, it is necessary to develop the necessary conditions, forms, content and tools for the integration of academic disciplines, ensuring a high level of knowledge of students. Modern didactics offers a number of approaches to the integration of academic disciplines, but the generally accepted content, form, and means of this process have not yet been developed.

This article discusses some of the ways in which programming languages, including C ++, have been used in practice to solve some physical problems as an integration of programming and physics, and how DevC ++ can be used to create graphs.

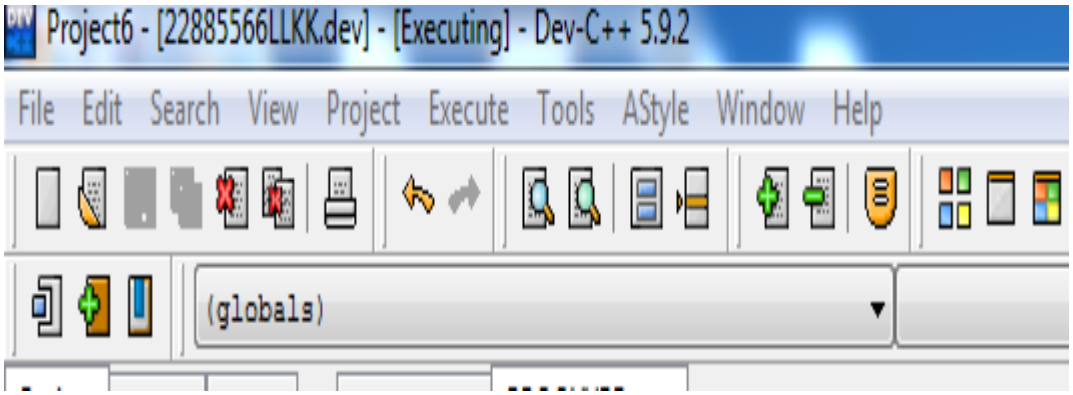
To use the DevC ++ programming language to create graphs, you must first configure the program to run in graphical mode.To do this, use DevC ++ version 4.9.9.2, and the configuration is performed in the following sequence: [1]

1. Download graphics .h and libbgi.h files;

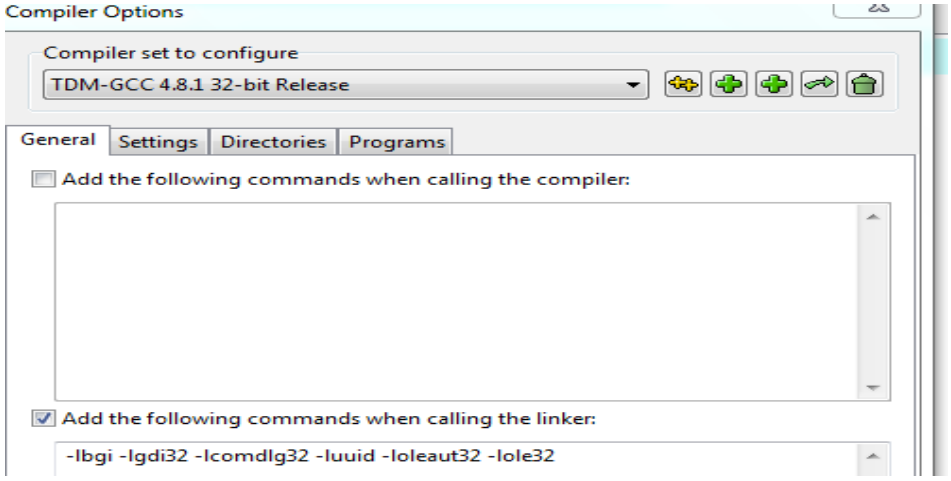
2. Copy the graphics .h file to the C: \ Dev-Cpp \ include \ directory;

3. Copy the libbgi.h file to the C: \ Dev-Cpp \ include \ directory;

4 Launch Dev-C ++ and select Compiler options from the Tools section;



Add these command to the linker command line ga bayroqcha o'rnatilib quyidagi satr yoziladi:



For Example 1, the problem is:

The ball was thrown at an angle of 40o to the horizon at a speed of 10 m / s. How high does the ball go? How far does it fall to the ground from where it was thrown? How long will it run? [3]

Solution:

The vertical component of the path is: - (1), and the vertical component of the velocity is: = / 2 - (2) The horizontal component of the path is: - (3). The equations are valid when t =. On the other hand, from (2) we get: = - (4). From (1) we find h = () t-gt21 / 2 - (5), from (4) we find t1:, we put it in (5): h = - = 5 m; When t =, then the total flight time: t == 1.5 s, from Equation (3): = 10m.

The graph obtained by this method is as follows:

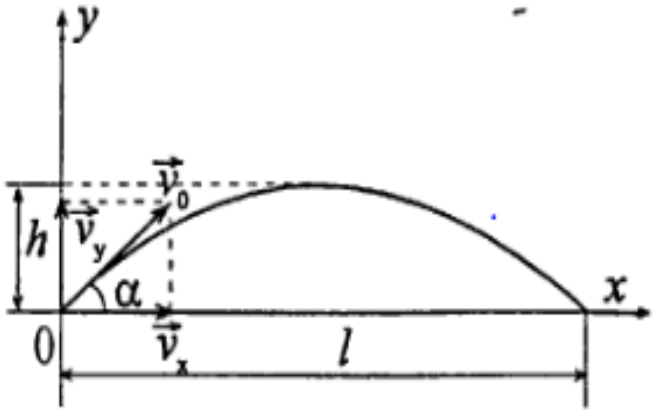


Figure 1. Analytical solution

Here is the program code for solving and graphing this problem in C ++: [2]

```
#include<iostream>
#include<graphics.h>
#include<conio.h>
#include<math.h>
using namespace std;
int main(){
 float w, l, f,  t, vx, h, g = 9.81, pi=3.1415;
 cout << "vx = ";  cin>>vx;
 cout << "h = "; cin >> h;
 t=sqrt((2*h)/g);
 w=vx/sqrt(pow(vx,2)+g*g*t*t);
 f=w*100;
  cout <<"Gradusi  =  "<<f << endl;
 initwindow(850, 600);
 setbkcolor(BLUE);
 cleardevice();
 setcolor(15);
 setcolor(15);
 line(10,40,540,40);
 line(10,40,10,300);
 line(10,40,5,55);
line(10,40,15,55);
 line(10,300,5,285);
 line(10,300,15,285);
 line(540,40,525,35);
 line(540,40,525,45);
 line(100,350,494,350);
 line(100,350,115,345);
 line(100,350,115,355);
 line(130,100,130,250);
 line(130,250,135,235);
 line(130,250,125,235);
 line(494,350,480,345);
 line(494,350,480,355);
 line(494,300,577,450);
```

```
 line(100, 10, 100, 400);
line(10, 300, 800, 300);
  line(800,300,785,295);
line(800,300,785,305);
line(100,400,105,385);
line(100,400,95,385);
//line(100,480,600,480);
//line(100,570,600,570);
setcolor(RED);
int x, y;
g = 0.75;
for(int t = 0; t < 395; t++){
  setlinestyle(0,1,2);
  putpixel(x, y, 1);
  x = 100 + t;
  y = 42 - 0.1 * t + g * t * t / 390;
  putpixel(x, y, 2);
  delay(10);
}
```

```
  line(577,450,562,442);
  line(577,450,577,435);
       line(494,450,494,300);
  line(494,450,500,435);
  line(494,450,488,435);
  outtextxy(140,150,"g");
  outtextxy(490,450," Vy ");
  outtextxy(590,435,"V");
  outtextxy(20,150," h ");
  outtextxy(150,15," Vx ");
  outtextxy(450,15," X ");
  outtextxy(750,280," Vx ");
  outtextxy(70,15," O ");
  outtextxy(300,360,"L");
  getch();
  closegraph();
  return 0;
}
```

By running this program, we get the following results:

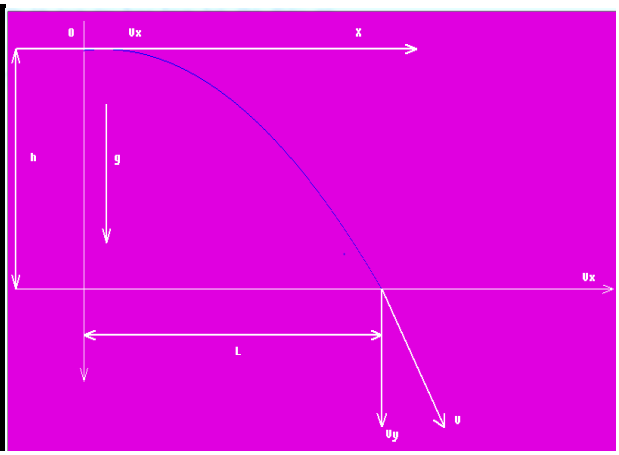


Figure 4. Results obtained by C ++ program

Here, too, it is clear that the solutions and graphics obtained by C ++ are almost indistinguishable from the analytical solutions and the graph.

instead: the use of software in the process of teaching physics not only provides interdisciplinary integration, but also serves to increase students' interest in these two disciplines, creative and scientific activity, and this method of teaching contributes to the quality of education. has a huge positive effect.

References

S.V. Glushakov and others. C ++ programming language. Kharkiv "Folio" 2001

Jess Liberti, “Self-sufficient S ++ for 21 days”, St. Petersburg 2000g.

V.S.Volkenshteyn. A set of questions from a general physics course. -Tashkent. "Teacher" -1969

www.mathsoft.com

Nazirov E.N., Xudaybergenova Z.A., Safiulna N.X. - Practicum in mechanics and molecular physics. - T., Teacher, 1979