Kpi-best

Міністерство освіти та науки України

Національний технічний університет України “Київський політехнічний інститут”

Факультет інформатики та обчислювальної техніки

Кафедра обчислювальної техніки

Лабораторна робота № 3

з курсу "Графічне та геометричне моделювання"

Виконав: студент 4 курсу

групи ІП-32

Ковтун А.В.

Київ – 2016

**Завдання:**

Построить поверхность по варианту, используя заданные математические формулы. 

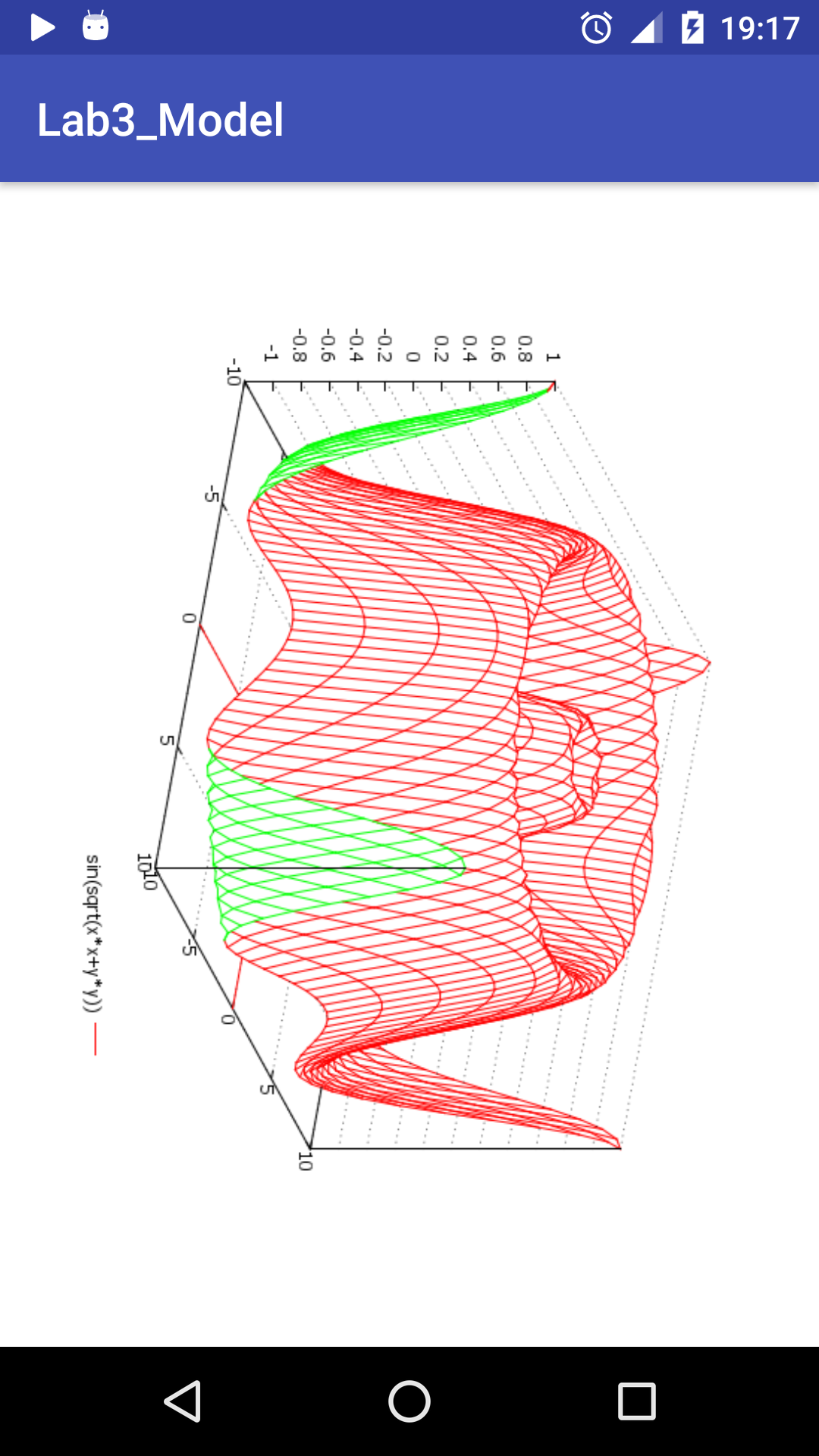
**Код програми**

**package** acid.a2softin.org.lab3\_model;  
  
**import** android.content.Context;  
**import** android.graphics.Canvas;  
**import** android.graphics.Color;  
**import** android.graphics.Paint;  
**import** android.graphics.Point;  
**import** android.os.Bundle;  
**import** android.support.v7.app.ActionBar;  
**import** android.support.v7.app.AppCompatActivity;  
**import** android.view.Display;  
**import** android.view.View;  
**import** android.view.ViewGroup;  
**import** android.view.animation.AnimationUtils;  
**import** android.widget.RelativeLayout;  
  
**public class** MainActivity **extends** AppCompatActivity  
{  
  
 @Override  
 **protected void** onCreate(Bundle savedInstanceState)  
 {  
 **super**.onCreate(savedInstanceState);  
 setContentView(R.layout.activity\_main);  
 RelativeLayout relativeLayout = (RelativeLayout) findViewById(R.id.relative\_layout);  
 ActionBar.LayoutParams layoutParams = **new** ActionBar.LayoutParams(ViewGroup.LayoutParams.MATCH\_PARENT, ViewGroup.LayoutParams.MATCH\_PARENT);  
 **final** View sceneView = **new** SceneDraw(getBaseContext(), (**short**) 9, (**short**) 50);  
 sceneView.setLayoutParams(layoutParams);  
 relativeLayout.addView(sceneView);  
 findViewById(R.id.fab).setOnClickListener(**new** View.OnClickListener()  
 {  
 @Override  
 **public void** onClick(View view)  
 {  
 sceneView.startAnimation(AnimationUtils.loadAnimation(getBaseContext(),R.anim.push\_animation));  
 }  
 });  
 }  
  
 **private class** SceneDraw **extends** View  
 {  
 Paint paint = **new** Paint();  
 **private short** offset = 0;  
 **private short** countOfFigures = 1;  
 **private** FigureSetting[] rects;  
 **private int** startX;  
 **private int** startY;  
 **private int** sizeFigure = 40;  
  
  
 **public** SceneDraw(Context context, **short** countOfFigures, **short** offset)  
 {  
 **super**(context);  
 paint.setColor(Color.BLACK);  
 paint.setStrokeWidth(5);  
 **this**.offset = offset;  
 **this**.countOfFigures = countOfFigures;  
 Display mdisp = getWindowManager().getDefaultDisplay();  
 startX = mdisp.getWidth() / 2 - 50;  
 startY = mdisp.getHeight() / 2 + 200;  
 rects = getFigureSettings(countOfFigures, offset);  
 }  
  
 **private** FigureSetting[] getFigureSettings(**short** count, **short** offset)  
 {  
 FigureSetting[] figureSettings = **new** FigureSetting[count];  
 figureSettings[0] = **new** FigureSetting(startX, startY, sizeFigure);  
 **if** (count == 1) **return** figureSettings;  
 **int** lastLeftX = startX, lastRightX = startX;  
 **int** lastLeftY = startY, lastRightY = startY;  
 **for** (**int** i = 1; i < figureSettings.length; i++) {  
 **if** (i % 2 == 0) {  
 figureSettings[i] = **new** FigureSetting(lastRightX + sizeFigure + offset, lastRightY - sizeFigure - offset, sizeFigure);  
 lastRightX = figureSettings[i].centerX;  
 lastRightY = figureSettings[i].centerY;  
 } **else** {  
 figureSettings[i] = **new** FigureSetting(lastLeftX - sizeFigure - offset, lastLeftY - sizeFigure - offset, sizeFigure);  
 lastLeftX = figureSettings[i].centerX;  
 lastLeftY = figureSettings[i].centerY;  
 }  
 }  
 **return** figureSettings;  
 }  
  
 @Override  
 **protected void** onDraw(Canvas canvas)  
 {  
 **for** (FigureSetting figureSetting : rects) {  
 drawBaseFigure(canvas, figureSetting.centerX, figureSetting.centerY, figureSetting.size);  
 }  
 }  
  
 **private void** drawBaseFigure(Canvas canvas, **int** centerX, **int** centerY, **int** sizeFigure)  
 {  
 Point point1\_draw = **new** Point(centerX + sizeFigure, centerY + sizeFigure);  
 Point point2\_draw = **new** Point(centerX - sizeFigure, centerY + sizeFigure);  
 Point point3\_draw = **new** Point(centerX, centerY);  
 canvas.drawLine(point1\_draw.x, point1\_draw.y, point2\_draw.x, point2\_draw.y, paint);  
 canvas.drawLine(point2\_draw.x, point2\_draw.y, point3\_draw.x, point3\_draw.y, paint);  
 canvas.drawLine(point3\_draw.x, point3\_draw.y, point1\_draw.x, point1\_draw.y, paint);  
  
 Point point12\_draw = **new** Point(centerX + sizeFigure, centerY - sizeFigure);  
 Point point22\_draw = **new** Point(centerX - sizeFigure, centerY - sizeFigure);  
 Point point32\_draw = **new** Point(centerX, centerY);  
 canvas.drawLine(point12\_draw.x, point12\_draw.y, point22\_draw.x, point22\_draw.y, paint);  
 canvas.drawLine(point22\_draw.x, point22\_draw.y, point32\_draw.x, point32\_draw.y, paint);  
 canvas.drawLine(point32\_draw.x, point32\_draw.y, point12\_draw.x, point12\_draw.y, paint);  
 }  
  
 **private class** FigureSetting  
 {  
 **public int** centerX;  
 **public int** centerY;  
 **public int** size;  
  
 **public** FigureSetting(**int** centerX, **int** centerY, **int** size)  
 {  
 **this**.centerX = centerX;  
 **this**.centerY = centerY;  
 **this**.size = size;  
 }  
 }  
 }  
}

*<?***xml version="1.0" encoding="utf-8"***?>*<**RelativeLayout  
 android:id="@+id/relative\_layout"  
 xmlns:android="http://schemas.android.com/apk/res/android"  
 xmlns:tools="http://schemas.android.com/tools"  
 android:layout\_width="match\_parent"  
 android:layout\_height="match\_parent"  
 android:paddingBottom="@dimen/activity\_vertical\_margin"  
 android:paddingLeft="@dimen/activity\_horizontal\_margin"  
 android:paddingRight="@dimen/activity\_horizontal\_margin"  
 android:paddingTop="@dimen/activity\_vertical\_margin"  
 tools:context="acid.a2softin.org.lab1\_model.MainActivity"**>  
  
 <**TextView  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:text="Лабораторная №3 \n Вариант 13"  
 android:textSize="19sp"  
 android:gravity="center"  
 android:layout\_alignParentTop="true"  
 android:layout\_centerHorizontal="true"**/>  
  
 <**android.support.design.widget.FloatingActionButton  
 android:id="@+id/fab"  
 android:layout\_width="wrap\_content"  
 android:layout\_height="wrap\_content"  
 android:layout\_alignParentBottom="true"  
 android:layout\_alignParentEnd="true"  
 android:clickable="true"  
 android:src="@drawable/arrow\_expand\_all"**/>  
</**RelativeLayout**>

apply **plugin**: **'com.android.application'**android {  
 compileSdkVersion 24  
 buildToolsVersion **"24.0.1"** defaultConfig {  
 applicationId **"acid.a2softin.org.lab3\_model"** minSdkVersion 18  
 targetSdkVersion 24  
 versionCode 1  
 versionName **"1.0"** }  
 buildTypes {  
 release {  
 minifyEnabled **false** proguardFiles getDefaultProguardFile(**'proguard-android.txt'**), **'proguard-rules.pro'** }  
 }  
}  
  
dependencies {  
 compile fileTree(**include**: [**'\*.jar'**], **dir**: **'libs'**)  
 testCompile **'junit:junit:4.12'** compile **'com.android.support:appcompat-v7:24.2.1'** compile **'com.android.support:design:24.2.1'**}

**Результат виконання**



**Высновки:** В даній лабораторній роботі був побудований об’ємний графік функції . Була обрана наступна система координат x in [-10..10]; y in [-10 ..10]; z in [-1..1]. Для обраних інтервалів було обраховано значення функції із інтервалом 0,1 та відповідні значення відображені на графіку.