**Листинг программы**

package mcha\_4\_1;

import java.text.NumberFormat;

public class Mcha\_4\_1 {

public static double F (double x){

double res = 2\*(x\*x+1)\*Math.sin(x);

return res;

}

public static double P1(double x){

double res = 2\*x;

return res;

}

public static double P2 (double x){

double res = -1;

return res;

}

public static double[][] FirstCalculation (double h, double x0)

{ //y[0][0]=0; y[0][0]=0;

double [][] res = new double [2][11];

res[0][0]=0;res[1][0]=0;

for(int j=0;j<10;j++){

double xj=x0+j\*h;

double res0Brackets=F(xj)-P1(xj)\*res[1][j]-P2(xj)\*res[0][j];

res[0][j+1]=res[0][j]+h\*(res[1][j]+h\*0.5\*res0Brackets);

double A = res[1][j]+h\*0.5\*res0Brackets;

double B = res[0][j]+h\*0.5\*res[1][j];

res[1][j+1]=res[1][j]+h\*(F(xj+h\*0.5)-P1(xj+h\*0.5)\*A-P2(xj+h\*0.5)\*B);

}

return res;

}

public static double[][] SecondCalculation (double h,double x0)

{ //y[0][0]=1; y[0][0]=0;

double [][] res = new double [2][11];

res[0][0]=1;res[1][0]=0;//!!!

for(int j=0;j<10;j++){

double xj=x0+j\*h;

double res0Brackets=(P1(xj)\*res[1][j]+P2(xj)\*res[0][j]);

res[0][j+1]=res[0][j]+h\*(res[1][j]-h\*0.5\*res0Brackets);

double A = res[1][j]-h\*0.5\*res0Brackets;

double B = res[0][j]+h\*0.5\*res[1][j];

res[1][j+1]=res[1][j]-h\*(P1(xj+h\*0.5)\*A+P2(xj+h\*0.5)\*B);

}

return res;

}

public static double[][] ThirdCalculation (double h,double x0)

{ //y[0][0]=0; y[0][0]=1;

double [][] res = new double [2][11];

res[0][0]=0;res[1][0]=1;//!!!

for(int j=0;j<10;j++){

double xj=x0+j\*h;

double res0Brackets=(P1(xj)\*res[1][j]+P2(xj)\*res[0][j]);

res[0][j+1]=res[0][j]+h\*(res[1][j]-h\*0.5\*res0Brackets);

double A = res[1][j]-h\*0.5\*res0Brackets;

double B = res[0][j]+h\*0.5\*res[1][j];

res[1][j+1]=res[1][j]-h\*(P1(xj+h\*0.5)\*A+P2(xj+h\*0.5)\*B);

}

return res;

}

public static void print (double[][]Matr){

int stop=6;

NumberFormat formatter = NumberFormat.getNumberInstance();

formatter.setMaximumFractionDigits(stop);

for(int i=0;i<2;i++){

for(int j=0;j<11;j++){

System.out.print(formatter.format(Matr[i][j])+" ");

}

System.out.println();

}

System.out.println();

}

public static void main(String[] args) {

double x0=0;

double A0=1;double B0=0;double N0=0;

double A1=1;double B1=1; double N1=-0.5\*Math.cos(0.5);

double a = 0; double b=0.5;

double h=(b-a)/10;

double[][] FirstM = FirstCalculation(h,x0);

double[][] SecondM = SecondCalculation(h,x0);

double[][] ThirdM = ThirdCalculation(h,x0);

print(FirstM);

print(SecondM);

print(ThirdM);

double[][] GM = new double [3][2];

double A = B0\*SecondM[0][10]+B1\*SecondM[1][10];

double B=B0\*ThirdM[0][10]+B1\*ThirdM[0][10];

double K=B0\*FirstM[0][10]+B1\*FirstM[1][10];

double C2 = (A0\*(N1-K)-A\*N0)/(A0\*B-A\*A1);

double C1 = (N0-A1\*C2)/A0;

System.out.println("C1= "+C1+", C2= "+C2);

for(int i=0;i<11;i++){

double u=FirstM[0][i]+C1\*SecondM[0][i]+C2\*ThirdM[0][i];

double xtemp = x0+i\*h;

System.out.println("xtemp= "+xtemp+", u= "+u);

System.out.println();

}

}

}