### Министерство науки и высшего образования Российской Федерации Федеральное государственное бюджетное образовательное учреждение высшего образования

«Российский химико-технологический университет имени Д.И. Менделеева»

## ОТЧЕТ ПО ЛАБОРАТОРНОЙ РАБОТЕ №1

# Вариант 22

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Ссылка на репозиторий: https://github.com/

CorgiPuppy/

num-methods-eq-math-phys-chem-labs

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Дата сдачи: 02.04.2025

Москва 2025

# Оглавление

Описание задачи	-
Выполнение задачи	4
Задание 1	4
Задание 2	4
Задание 3	•
Задание 4	4
Задание 5	4
Задание 6	
Задание 7	۲
Задание 8	٠

## Описание задачи

Вариант	Уравнение	Интервалы переменных	Начальные и граничные условия			
22	$\frac{\partial u}{\partial t} = \frac{\partial^2 u}{\partial x^2}$	$x \in [0, 1]$ $t \in [0, 1]$	$u(t = 0, x) = e^{x}$ $u(t, x = 0) = e^{t}$ $u(t, x = 1) = e^{t+1}$			

Для заданного уравнения:

- 1. записать явную разностную схему;
- 2. определить порядок аппроксимации разностной схемы;
- 3. получить условие устойчивости разностной схемы на шаг (с помощью метода гармоник);
- 4. вывести рекуррентное соотношение;
- 5. составить алгоритм (блок-схему) расчёта;
- 6. построить программу на любом удобном языке программирования;
- 7. провести численный расчёт с использованием различных значений  $\Delta t(0.1, 0.01, 0.001),$  h=0.1;
- 8. составить отчёт о проделанной работе.

#### Выполнение задачи

#### Задание 1

Записать явную разностную схему:

$$\frac{u_j^{n+1} - u_j^n}{\Delta t} = \frac{u_{j+1}^n - 2u_j^n + u_{j-1}^n}{h^2}.$$
 (1)

В записанной разностной схеме (1) аппроксимация второй производной функции u(t,x) по координате рассматривается на n-м шаге по времени, т.е. относительно точки  $t^n$ , для которой рассматривается аппроксимация всего уравнения. Такая разностная схема называется **явной**.

#### Задание 2

Определить порядок аппроксимации разностной схемы (1):

Для этого запишу разложение значений  $u_j^{n+1},\,u_{j+1}^n,\,u_{j-1}^n$  в ряд Тейлора относительно точки  $(t^n,\,x_j)$  на разностной сетке:

$$u_j^{n+1} = u_j^n + \frac{\partial u}{\partial t}\Big|_i^n \Delta t + \frac{1}{2!} \frac{\partial^2 u}{\partial t^2}\Big|_i^n (\Delta t)^2 + \frac{1}{3!} \frac{\partial^3 u}{\partial t^3}\Big|_i^n (\Delta t)^3 + \dots,$$
 (2)

$$u_{j+1}^{n} = u_{j}^{n} + \frac{\partial u}{\partial x} \Big|_{j}^{n} h + \frac{1}{2!} \frac{\partial^{2} u}{\partial x^{2}} \Big|_{j}^{n} h^{2} + \frac{1}{3!} \frac{\partial^{3} u}{\partial x^{3}} \Big|_{j}^{n} h^{3} + \frac{1}{4!} \frac{\partial^{4} u}{\partial x^{4}} \Big|_{j}^{n} h^{4} + \dots,$$
(3)

$$u_{j-1}^n = u_j^n - \frac{\partial u}{\partial x}\Big|_i^n h + \frac{1}{2!} \frac{\partial^2 u}{\partial x^2}\Big|_i^n h^2 - \frac{1}{3!} \frac{\partial^3 u}{\partial x^3}\Big|_i^n h^3 + \frac{1}{4!} \frac{\partial^4 u}{\partial x^4}\Big|_i^n h^4 - \dots$$
 (4)

Подставляя зависимости (2)-(4) в разностную схему (1), получаем:

$$\frac{\partial u}{\partial t}\Big|_{j}^{n} + \frac{1}{2} \frac{\partial^{2} u}{\partial t^{2}}\Big|_{j}^{n} \Delta t + \frac{1}{6} \frac{\partial^{3} u}{\partial t^{3}}\Big|_{j}^{n} (\Delta t)^{2} = \frac{\partial^{2} u}{\partial x^{2}}\Big|_{j}^{n} + \frac{1}{12} \frac{\partial^{4} u}{\partial x^{4}}\Big|_{j}^{n} h^{2}.$$

$$\Rightarrow \frac{\partial u}{\partial t}\Big|_{j}^{n} + O(\Delta t) = \frac{\partial^{2} u}{\partial x^{2}}\Big|_{j}^{n} + O(h^{2}).$$

Таким образом, явная разностная схема (1) аппроксимирует исходное дифференциальное уравнение с первым порядком по времени и со вторым порядком по координате, что записывается в следующем виде:

$$O(\Delta t) + O(h^2)$$
 или  $O(\Delta t, h^2)$ .

#### Задание 3

Получить условие устойчивости разностной схемы на шаг (с помощью метода гармоник):

Представлю решение разностной схемы в виде гармоники:

$$u_j^n = \lambda^n e^{i\alpha j}. (5)$$

Подставляя (5) в разностную схему (1), получаю:

$$\frac{\lambda^{n+1}e^{i\alpha j}-\lambda^n e^{i\alpha j}}{\Delta t}=\frac{\lambda^n e^{i\alpha (j+1)}-2\lambda^n e^{i\alpha j}+\lambda^n e^{i\alpha (j-1)}}{h^2}.$$

Упрощаю полученное выражение, деля левую и правую его части на  $\lambda^n e^{i\alpha j}$ :

$$\frac{\lambda - 1}{\Delta t} = \frac{e^{i\alpha} - 2 + e^{-i\alpha}}{h^2}.$$

Преобразую комплексные числа из экспоненциальной формы в тригонометрическую:

$$e^{\pm i\alpha} = \cos \alpha \pm i \sin \alpha \Rightarrow \frac{\lambda - 1}{\Delta t} = \frac{2\cos \alpha - 2}{h^2}.$$

Используя тригонометрические тождества

$$\cos \alpha = \cos^2 \frac{\alpha}{2} - \sin^2 \frac{\alpha}{2} = 1 - 2\sin^2 \frac{\alpha}{2},$$

получаю формулу, из которой затем выражаю  $\lambda$ :

$$\frac{\lambda - 1}{\Delta t} = \frac{-4\sin^2\frac{\alpha}{2}}{h^2} \Rightarrow \lambda = 1 - \frac{4\Delta t}{h^2}\sin^2\frac{\alpha}{2}.$$

С учётом необходимого условия устойчивости разностных схем  $|\lambda| \leq 1$  имею:

$$-1 \le 1 - \frac{4\Delta t}{h^2} \sin^2 \frac{\alpha}{2} \le 1.$$

В полученном двойном неравенстве правое условие выполняется автоматически. Поэтому рассмотрю более подробно левое условие:

$$1 - \frac{4\Delta t}{h^2} \sin^2 \frac{\alpha}{2} \ge -1 \Rightarrow \frac{\Delta t}{h^2} \sin^2 \frac{\alpha}{2} \le \frac{1}{2}.$$

Задавая для  $\sin^2\frac{\alpha}{2}$  максимально возможное значение, равное 1, перехожу к более строгому условию, справедливому для любого  $\alpha$ :

$$\frac{\Delta t}{h^2} \sin^2 \frac{\alpha}{2} \le \frac{1}{2} \Rightarrow \frac{\Delta t}{h^2} \le \frac{1}{2}.$$
 (6)

Выражение (6) является условием устойчивости явной разностной схемы, аппроксимирующей одномерное дифференциальное уравнение параболического типа. Такие

разностные схемы, устойчивость которых зависит от какого-либо условия, ограничивающего выбор интервала деления на разностной сетке, называют **условно устойчивыми**.

При  $h = 10^{-1}$ :

$$\Delta t \le \frac{(10^{-1})^2}{2} \Rightarrow \Delta t \le 5 \cdot 10^{-3}.$$

#### Задание 4

Вывести рекуррентное соотношение:

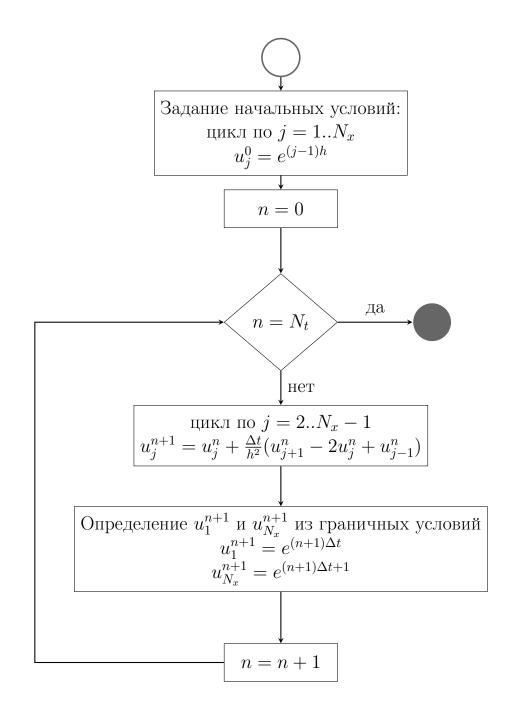
Выражаю из разностной схемы (1) величину  $u_i^{n+1}$ :

$$u_j^{n+1} = u_j^n + \frac{\Delta t}{h^2} (u_{j+1}^n - 2u_j^n + u_{j-1}^n).$$
 (7)

Соотношение типа (7), позволяющее рассчитывать значения искомой функции в узлах разностной сетки через известные значения в других узлах разностной сетки, называют рекуррентным соотношением.

#### Задание 5

Составить алгоритм (блок-схему) расчёта:



Задание 6

Построить программу на любом удобном языке программирования:

```
1 #include <iostream>
2 #include <cmath>
3 #include <fstream>
4

5 #include "../include/Constants.h"

6 int main() {
   int N_x = 1 + (Constants::x_end - Constants::x_start) / Constants::h;
   int N_t[Constants::amount_of_delta_t] = {0};
   for (int i = 0; i < Constants::amount_of_delta_t; i++) {
     N_t[i] = 1 + (Constants::t_end - Constants::t_start) / Constants::delta_t[i];
}</pre>
```

```
14
     for (int i = 0; i < Constants::amount_of_delta_t; i++) {</pre>
15
       double** u = new double*[N_t[i]];
16
       for (int n = 0; n < N_t[i]; n++) {</pre>
17
           u[n] = new double[N_x] \{0.0\};
18
19
20
       for (int j = 0; j \le N_x - 1; j++) {
21
         u[0][j] = std::exp(j * Constants::h);
22
23
24
       int n = 0;
25
       while (!(n == (N_t[i] - 1))) {
26
         for (int j = 1; j \le N_x - 2; j++)
27
           u[n + 1][j] = u[n][j] + (Constants::delta_t[i]) / (std::pow(Constants::h, 2))
       *(u[n][j + 1] - 2 * u[n][j] + u[n][j - 1]);
28
29
         u[n + 1][0] = std::exp((n + 1) * Constants::delta_t[i]);
30
         u[n + 1][N_x - 1] = std::exp((n + 1) * Constants::delta_t[i] + 1);
31
32
         n++;
33
       }
34
35
       std::ofstream csvFile(Constants::csvPath[i]);
36
       csvFile << "t\\x,";</pre>
37
       for (int j = 0; j \le N_x - 1; j++) {
38
         csvFile << j * Constants::h;</pre>
39
          if (j != (N_x - 1)) csvFile << ",";</pre>
40
       }
41
       csvFile << "\n";
42
       for (int n = 0; n < N_t[i]; n++) {</pre>
43
         double t = (n + 1) * Constants::delta_t[i];
44
         csvFile << t << ",";
45
         for (int j = 0; j < N_x; j++) {
46
            csvFile << u[n][j];</pre>
47
           if (j != (N_x - 1)) csvFile << ",";</pre>
48
49
         csvFile << "\n";
50
51
       csvFile.close();
52
53
       std::ofstream plotPath (Constants::plotPath[i]);
54
       for (int n = 0; n <= N_t[i] - 1; n++) {</pre>
55
         double t = n * Constants::delta_t[i];
56
         for (int j = 0; j <= N_x - 1; j++) {</pre>
57
           double x = j * Constants::h;
58
           plotPath << t << " " << x << " " << u[n][j] << "\n";
59
60
         plotPath << "\n";</pre>
61
62
       plotPath.close();
63
64
       for (int n = 0; n < N_t[i]; n++) {</pre>
65
           delete[] u[n];
66
67
       delete[] u;
68
69
70
     return 0;
71 }
```

## Задание 7

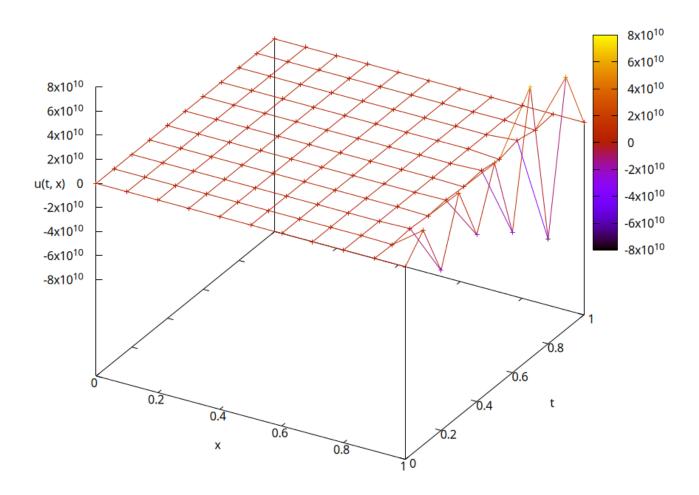
Провести численный расчёт с использованием различных значений  $\Delta t(0.1,0.01,0.001),$  h=0.1:

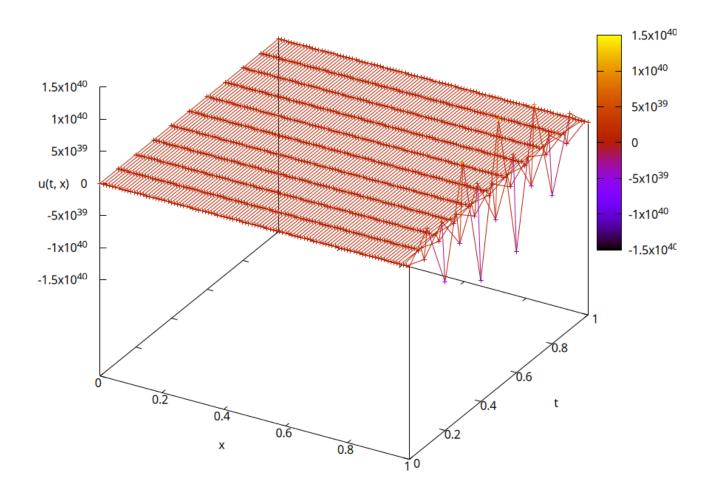
Таблица 1: Результаты

$t \backslash x$	0	0.1	0.2	0.3	0.4	0.5	0.6	0
0.1	1	1.10517	1.2214	1.34986	1.49182	1.64872	1.82212	2.0
0.2	1.10517	1.21578	1.34364	1.48496	1.64113	1.81373	2.00448	2.2
0.3	1.2214	1.38834	1.47812	1.63358	1.80538	1.99526	2.2051	2.43
0.4	1.34986	0.616875	2.13481	1.79707	1.98607	2.19495	2.42579	2.68
0.5	1.49182	23.1261	-16.422	7.06448	2.18484	2.41462	2.66857	16.'
0.6	1.64872	-588.697	613.923	-276.597	53.2791	2.65629	141.23	-754
0.7	1.82212	17341	-20317.5	11927.4	-3751.71	1894.62	-10202.2	32
0.8	2.01375	-532635	678716	-467312	209502	-175536	536977	-1.270
0.9	2.22554	$1.69072\mathrm{e}{+07}$	$-2.28951\mathrm{e}{+07}$	$1.77611\mathrm{e}{+07}$	-1.0409e+07	$1.08\mathrm{e}{+07}$	$-2.46608\mathrm{e}{+07}$	4.7954
1	2.4596	-5.50188e+08	$7.8169\mathrm{e}{+08}$	-6.70502e+08	$4.83382e{+08}$	$-5.55898\mathrm{e}{+08}$	$1.0561\mathrm{e}{+09}$	-1.780
1.1	2.71828	$1.82705\mathrm{e}{+10}$	-2.7059e+10	$2.53903e{+10}$	-2.14483e+10	$2.59569\mathrm{e}{+10}$	-4.34259e+10	6.5598

## Задание 8

Составить отчёт о проделанной работе. График фукнции  $u(t,\,x)$ 





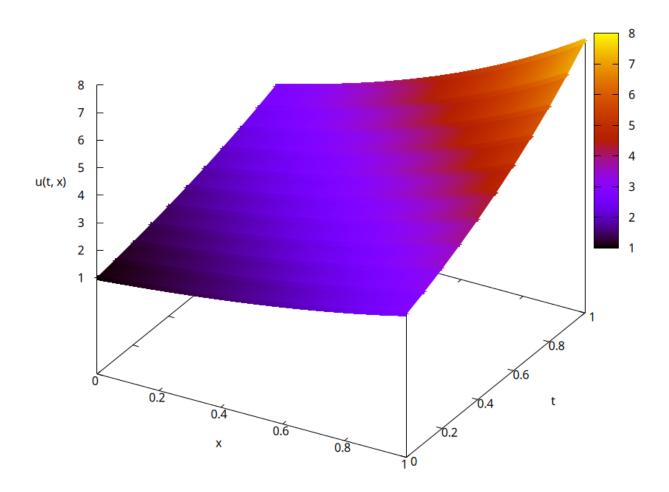


Таблица 2: Результаты										
7	$t \backslash x$	0	0.1	0.2	0.3	0.4	0.5	0.6		
	0.01	1	1.10517	1.2214	1.34986	1.49182	1.64872	1.82212	2.0	
(	0.02	1.01005	1.11623	1.23363	1.36337	1.50676	1.66522	1.84036	2.0	
(	0.03	1.0202	1.12745	1.24597	1.37701	1.52184	1.68189	1.85877	2.0	
(	0.04	1.03045	1.13873	1.25849	1.3908	1.53707	1.69872	1.87738	2.0	
(	0.05	1.04081	1.15021	1.27104	1.40476	1.55245	1.71572	1.89617	2.	
(	0.06	1.05127	1.16164	1.28393	1.41873	1.56803	1.73289	1.91526	2.	
(	0.07	1.06184	1.17356	1.29644	1.43322	1.5836	1.75039	1.93409	2.3	
(	0.08	1.07251	1.18472	1.31034	1.44682	1.60002	1.76729	1.95473	2.	
(	0.09	1.08329	1.19812	1.3212	1.46354	1.61409	1.78746	1.97035	2.	
	0.1	1.09417	1.20636	1.34046	1.47175	1.63691	1.79697	2.00233	2.	
(	0.11	1.10517	1.22827	1.33765	1.50563	1.63181	1.84227	1.98583	2.5	
(	0.12	1.11628	1.21455	1.39625	1.46384	1.71609	1.77537	2.11386	2.	
(	0.13	1.1275	1.29798	1.28214	1.6485	1.52312	2.05458	1.81844	2.	
	0.14	1.13883	1.11165	1.66434	1.15676	2.17995	1.28698	2.75892	1.	
	0.15	1.15027	1.69152	0.60407	2.68754	0.263782	3.6519	0.11054	4.3	
	0.16	1.16183	0.0628276	3.77499	-1.81969	6.07565	-3.27757	7.85821	-3.	
	0.17	1.17351	4.87399	-5.53184	11.6703	-11.1729	17.2114	-14.4528	18	
	0.18	1.1853	-9.23233	22.0762	-28.3751	40.0547	-42.8371	50.0559	-43	
	0.19	1.19722	32.4938	-59.6836	90.5059	-111.267	132.948	-136.044	13	
	0.2	1.20925	-90.9801	182.683	-261.456	334.72	-380.258	401.043	-36	
- 1	0.21	1.2214	274.873	-535.12	778.86	-976.435	1116.02	-1148.66	10	
	0.22	1.23368	-808.771	1588.85	-2290.42	2871.32	-3241.11	3323.72	-3(	
	0.23	1.24608	2398.86	-4688.04	6750.58	-8402.85	9436.15	-9585.86	86	
	0.24	1.2586	-7085.65	13837.5	-19841.5	24589.6	-27424.9	27688.4	-24	
	0.25	1.27125	20924.4	-40764.6	58268.5	-71855.9	79702.8	-79967.4	71	
	0.26	1.28403	-61687.7	119958	-170889	209827	-231526	231065	-20	
	0.27	1.29693	181647	-352534	500674	-612242	672419	-667844	59	
	0.28	1.30996	-534179	1.03485e+06	-1.46545e+06	1.78534e+06	-1.95251e+06	1.9309e+06	-1.70	
	0.29	1.32313	1.56904e+06	-3.03448e+06	4.28564e + 06	-5.20329e+06	5.66874e + 06	-5.5844e+06	4.902	
	0.3	1.33643	-4.60352e+06	8.88916e+06	-1.25234e+07	1.51577e + 07	-1.64564e+07	1.61554e + 07	-1.41	
	0.31	1.34986	1.34927e+07	$-2.60161\mathrm{e}{+07}$	3.65703e+07	-4.41375e+07	4.77695e+07	-4.67497e+07	4.079	
	0.32	1.36343	-3.95088e+07	7.6079e+07	-1.06724e+08	1.28477e + 08	-1.38657e+08	1.35316e+08	-1.17	
	0.33	1.37713	1.15588e + 08	-2.22312e+08	3.1128e+08	-3.73858e+08	4.0245e+08	-3.91762e+08	3.402	
	0.34	1.39097	-3.37899e+08	6.4918e + 08	-9.0745e+08	1.08759e+09	-1.16807e+09	1.13446e+09	-9.83	
	0.35	1.40495	9.87079e+08	-1.89453e+09	2.64422e+09	-3.16311e+09	3.39012e+09	-3.28582e+09	2.842	
	0.36	1.41907	-2.88161e+09	5.52583e+09	-7.70185e+09	9.19744e+09	-9.83905e+09	9.51872e+09	-8.22	
	0.37	1.43333	8.40743e+09	-1.61093e+10	2.24251e+10	-2.67383e+10	2.85552e+10	-2.75795e+10	2.378	
	0.38	1.44773	-2.45167e+10	4.69418e+10	-6.52728e+10	7.77187e+10	-8.2873e+10	7.99207e+10	-6.88	
	0.39	1.46228	7.14586e+10	-1.36731e+11	1.89933e+11	-2.25864e+11	2.40512e+11	-2.31629e+11	1.992	
	0.4	1.47698	-2.0819e+11	3.98123e+11	-5.52529e+11	6.5631e+11	-6.98006e+11	6.71403e+11	-5.76	
	0.41	1.49182	6.06313e+11	-1.15884e+12	1.60696e+12	-1.90685e+12	2.02572e+12	-1.94636e+12	1.67	
	0.42	1.50682	-1.76516e+12	3.37212e+12	-4.67265e+12	5.53953e+12	-5.87892e+12	5.64298e+12	-4.84	
	0.43	1.52196	5.13727e+12	-9.80992e+12	1.35843e+13	-1.60911e+13	1.70614e+13	-1.63619e+13	1.402	
	0.44	1.53726	-1.49472e+13	2.85315e+13	-3.94853e+13	4.67368e+13	-4.95145e+13	4.74459e+13	-4.06	
	0.45	1.55271	4.34787e+13	-8.2964e+13	1.14754e+14	-1.35737e+14	1.43697e+14	-1.37593e+14	1.177	
	0.46	1.56831	-1.26443e+14	2.41196e+14	-3.33454e+14	3.94187e+14	-4.17027e+14	3.99047e+14	-3.41	
	0.47	1.58407	3.67639e+14	-7.01093e+14	9.68838e+14	-1.14467e+15	1.21026e+15	-1.15739e+15	9.894	
	0.48	1.59999	-1.06873e + 15	2.03757e+15	-2.8146e+15	3.32377e+15	-3.51232e+15	3.35708e+15	-2.86	
	0.49	1.61607	3.1063e+15	-5.9209e+15	8.17594e+15	-9.65069e+15	1.01932e+16	-9.7379e+15	8.317	
	0.5	1.63232	-9.02721e+15	1.72031e+16	-2.37475e+16	2.80198e+16	-2.95818e+16	2.82481e+16	-2.41	
	0.51	1.64872	2.62303e+16	-4.99779e+16	6.89705e+16	-8.13491e+16	8.58497e+16	-8.19468e+16	6.993	
	0.52	1.66529	-7.62082e+16	1.45179e + 17	-2.00297e+17	2.36169e+17	-2.49146e+17	2.37734e+17	-2.02	
	0.53	1.68203	2.21387e+17	-4.21684e+17	5.81645e+17	-6.85612e+17	7.23049e+17	-6.89709e+17	5.882	
	0.54	1.69893	-6.43071e+17	1.22472e+18	-1.68894e + 18	1.99031e+18	-2.09837e+18	2.00103e+18	-1.70	
	0.55	1.71601	1.86779e + 18	-3.55673e+18	4.90396e+18	-5.77762e+18	6.08971e+18	-5.8057e + 18	4.94	
	0.56	1.73325	-5.42452e+18	1.03285e+19	-1.42383e+19	1.67713e+19	-1.7673e+19	1.68448e+19	-1.43	

0.57

0.50

1.75067

 $1.5753e{+}19$ 

-2.99913e+19

 $4.13381e{+19}$ 

-4.86826e + 19

 $5.12891e{+19}$ 

1 400 47 + 00

-4.88751e+19

4.164

1 00

Таблица 3: Результаты

0.002         1.001         1.0062         1.02283         1.35212         1.48981         1.65027         1.82797         2.01777         2.2272         2.4696         2.7737           0.004         1.003         1.0849         1.22387         1.35289         1.49881         1.63308         1.8276         2.01981         2.2323         2.4674         2.7241           0.005         1.00601         1.1071         1.2263         1.35287         1.49081         1.65861         1.83102         2.02835         2.2387         2.47141         2.7346           0.006         1.00501         1.11291         1.22899         1.35091         1.50831         1.65861         1.83102         2.02835         2.23874         2.47141         2.7346           0.001         1.0004         1.11161         1.23245         1.36607         1.50632         1.66331         1.8366         2.02933         2.24162         2.44948         2.4728           0.011         1.01005         1.11428         1.2336         1.36661         1.50882         1.66331         1.8484         2.24367         2.48133         2.74533           0.012         1.01005         1.11248         1.23361         1.36661         1.50842         1.66626					Taon	ица э. т е	езультать	1				
0.002         1.001         1.10628         1.2235         1.35255         1.39381         1.65092         1.8277         2.01777         2.223         2.4636         2.7237           0.004         1.003         1.0889         1.22357         1.33592         1.49631         1.65368         1.8276         2.01981         2.2232         2.4678         2.7237           0.005         1.00501         1.11071         1.22357         1.35789         1.00631         1.65308         1.82402         2.0183         2.22323         2.4674         2.7340           0.006         1.00501         1.11171         1.22357         1.35789         1.50331         1.6031         1.83402         2.0293         2.24141         2.47941         2.7319           0.007         1.00503         1.11405         1.23245         1.36007         1.50381         1.66361         1.83402         2.0293         2.24171         2.47848         2.7432           0.011         1.01005         1.11428         1.23361         1.36661         1.50881         1.66863         1.8441         2.24507         2.48433         2.7453           0.012         1.0100         1.11428         1.23361         1.36661         1.50814         1.66963 <th< th=""><th><math>t \backslash x</math></th><th>0</th><th>0.1</th><th>0.2</th><th>0.3</th><th>0.4</th><th>0.5</th><th>0.6</th><th>0.7</th><th>0.8</th><th>0.9</th><th>1</th></th<>	$t \backslash x$	0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.8	0.9	1
0.003         1.0092         1.10738         1.22355         1.53256         1.1948         1.65269         1.82577         2.01779         2.232         2.16613         2.72761           0.005         1.00601         1.1096         1.2253         1.35527         1.19781         1.65533         1.82912         2.02183         2.22146         2.16916         2.72941           0.006         1.00601         1.11124         1.22576         1.35799         1.50081         1.68593         1.83192         2.0279         2.24111         2.7319           0.008         1.00708         1.11161         1.22324         1.36207         1.50632         1.66391         1.83492         2.2279         2.24112         2.47082         2.74012           0.01         1.00904         1.11516         1.23284         1.36207         1.50632         1.6633         1.88496         2.80196         2.24567         2.48184         2.74012           0.011         1.01006         1.11152         1.23351         1.36616         1.50984         2.0341         2.04818         2.74612           0.013         1.0106         1.1174         1.23451         1.36635         1.58115         1.66633         1.88492         2.04011         2.25603	0.001	1	1.10517	1.2214	1.34986	1.49182	1.64872	1.82212	2.01375	2.22554	2.4596	2.71828
0.003         1.0092         1.10738         1.22355         1.53256         1.1948         1.65269         1.82577         2.01779         2.232         2.16613         2.72761           0.005         1.00601         1.1096         1.2253         1.35527         1.19781         1.65533         1.82912         2.02183         2.22146         2.16916         2.72941           0.006         1.00601         1.11124         1.22576         1.35799         1.50081         1.68593         1.83192         2.0279         2.24111         2.7319           0.008         1.00708         1.11161         1.22324         1.36207         1.50632         1.66391         1.83492         2.2279         2.24112         2.47082         2.74012           0.01         1.00904         1.11516         1.23284         1.36207         1.50632         1.6633         1.88496         2.80196         2.24567         2.48184         2.74012           0.011         1.01006         1.11152         1.23351         1.36616         1.50984         2.0341         2.04818         2.74612           0.013         1.0106         1.1174         1.23451         1.36635         1.58115         1.66633         1.88492         2.04011         2.25603	0.002	1.001	1.10628	1.22263	1.35121	1.49332	1.65037	1.82394	2.01577	2.22777	2.46206	2.721
0.004         1.003         1.0084         1.2283         1.25727         1.49781         1.65363         1.8276         2.02835         2.22446         2.4960         2.7291           0.006         1.00501         1.11171         1.22535         1.35769         1.50831         1.65831         1.8284         2.02183         2.2346         2.47191         2.7316           0.006         1.00502         1.11194         1.22999         1.36934         1.00311         1.66363         1.8366         2.0293         2.24312         2.47194         2.7378           0.001         1.0004         1.11162         1.23942         1.36071         1.50582         1.66331         1.8366         2.0293         2.24312         2.47898         2.7488           0.012         1.0106         1.11162         1.23392         1.36167         1.50833         1.8404         2.0343         2.24502         2.4833         2.7560           0.012         1.01061         1.117         1.23786         1.36737         1.51183         1.66563         1.8441         2.24507         2.24482         2.24912         2.24833         2.7518           0.012         1.01013         1.12281         1.23739         1.36784         1.66563 <th< td=""><td></td><td></td><td></td><td></td><td>1</td><td></td><td></td><td></td><td></td><td>2.23</td><td>2.46453</td><td>1</td></th<>					1					2.23	2.46453	1
0.006         1.00401         1.1090         1.22753         1.55668         1.4993         1.65593         1.82942         2.02183         2.2346         2.4994         2.7319           0.007         1.00602         1.11182         1.22576         1.35799         1.50081         1.65693         1.8302         2.0278         2.2418         2.47141         2.7366           0.008         1.00702         1.11161         1.23294         1.36077         1.50081         1.66331         1.83042         2.23992         2.24182         2.4708         2.74118         2.7466         2.7401         2.48184         2.7466         2.7401         2.48184         2.7466         2.0010         1.0010         1.11161         1.23345         1.36661         1.50884         1.66331         1.8344         2.03467         2.24172         2.48184         2.7460         0.011         1.0100         1.11152         1.23381         1.36661         1.50884         1.66331         1.84142         2.0803         2.25102         2.48184         2.74502         2.24102         2.48184         2.7538         2.7511         0.011         1.011         1.23411         1.37166         1.51589         1.67532         1.881492         2.02121         2.22191         2.49072												
0.008         0.0702         1.11291         0.2299         0.35931         1.50231         1.60231         1.63673         2.0279         2.24112         2.47892         2.73712         0.701         0.001         1.00004         1.11516         1.23245         1.36207         1.50832         1.66363         1.8386         2.03196         2.24367         2.48184         2.74288           0.012         1.0106         1.1174         1.23492         1.36797         1.50833         1.66666         1.82422         2.03030         2.25016         2.48814         2.74388           0.013         1.01071         1.11852         1.23615         1.36616         1.50884         1.66666         1.84412         2.03807         2.25919         2.4979         2.7588           0.014         1.01308         1.1194         1.23739         1.37655         1.51136         1.67936         1.44897         2.04111         2.25497         2.49719         2.7588           0.014         1.01613         1.1288         1.23987         1.37707         1.5138         1.67362         1.85197         2.0412         2.25619         2.07772         2.7538           0.015         1.01113         1.12481         1.23751         1.3748         1.51893 </td <td></td>												
					I							1
					I							1
0.0101         1.01005         1.11628         1.23368         1.36479         1.56882         1.66633         1.84044         2.343         2.24791         2.4833         2.7456           0.013         1.01007         1.11852         1.23615         1.36616         1.50984         1.66863         1.84197         2.03007         2.25247         2.4833         2.7518           0.014         1.01308         1.11964         1.23739         1.36733         1.51135         1.6773         1.84197         2.04011         2.25467         2.4919         2.7588           0.015         1.0141         1.12767         1.23837         1.37077         1.51438         1.67732         1.84197         2.04021         2.25919         2.49678         2.7538           0.017         1.01613         1.123         1.24235         1.37361         1.5189         1.67762         1.85182         1.04621         2.25171         2.90782         2.25371         2.50178         2.7668           0.018         1.01637         1.24484         1.37576         1.52045         1.68036         1.85532         2.06342         2.25577         2.50429         2.67676           0.021         1.02021         1.26368         1.24783         1.53741					1							1
0.012         1.01106         1.1174         1.23492         1.36479         1.5083         1.66696         1.84228         2.03603         2.25016         2.4868         2.74831           0.013         1.01207         1.11852         1.23615         1.36616         1.50984         1.66683         1.84412         2.03807         2.25242         2.4883         2.7511           0.014         1.01308         1.11964         1.23739         1.36753         1.51286         1.67197         1.84782         2.04011         2.25693         2.49292         2.7561           0.016         1.01511         1.1218         1.24111         1.37164         1.51589         1.67632         1.85152         2.04624         2.25919         2.49678         2.76218           0.019         1.01616         1.12225         1.24359         1.37488         1.51893         1.67868         1.85522         2.06034         2.26597         2.5078         2.57648           0.019         1.01918         1.12637         1.24484         1.37764         1.52197         1.68204         1.85692         2.06034         2.26577         2.50679         2.77041           0.021         1.02224         1.12576         1.24688         1.35794         1.6834												
0.014         1.01308         1.11964         1.23739         1.36793         1.51135         1.6703         1.84597         2.04011         2.25697         2.49129         2.75681           0.016         1.01511         1.12188         1.23987         1.37027         1.51438         1.67362         1.84967         2.04624         2.256193         2.49429         2.7563           0.017         1.01613         1.1281         1.24111         1.37164         1.51559         1.87632         1.85152         2.04624         2.26145         2.49698         2.7676           0.019         1.01816         1.25255         1.24359         1.37348         1.51839         1.67868         1.85522         2.05034         2.9657         2.50679         2.7766           0.021         1.0918         1.12637         1.24484         1.37576         1.52455         1.6804         1.85804         1.85804         2.05679         2.26527         2.5093         2.27731         2.5093         2.77318           0.021         1.02022         1.1275         1.24583         1.37891         1.52591         1.68871         1.86689         2.0565         2.27761         2.51882         2.7871           0.023         1.02129         1.13202 <td></td>												
			1.12076	1.23863	1					2.25693	2.49429	1
	0.016	1.01511	1.12188	1.23987	1.37027	1.51438	1.67365	1.84967	2.0442	2.25919		2.75936
0.019         1.01816         1.12525         1.24359         1.37438         1.51893         1.67568         1.85708         2.05249         2.05697         2.50429         2.76764           0.021         1.0202         1.1275         1.24484         1.37576         1.52945         1.68204         1.85894         2.05249         2.26671         2.50679         2.77044           0.021         1.0202         1.1275         1.24608         1.37781         1.52197         1.68204         1.85894         2.05655         2.27675         2.5181         2.7731           0.023         1.02224         1.12063         1.24733         1.37881         1.52349         1.68541         1.86660         2.05656         2.27787         2.5184         2.77875           0.024         1.02327         1.13089         1.24983         1.38266         1.52861         1.68878         1.86633         2.06662         2.27730         2.51936         2.7813           0.025         1.02434         1.34815         1.25233         1.38541         1.52961         1.68947         1.86623         2.0681         2.2818         2.5244         2.7888           0.025         1.02341         1.34566         1.25681         1.53824         1.69955 <td>0.017</td> <td></td> <td>1.123</td> <td>1.24111</td> <td>1.37164</td> <td>1.51589</td> <td>1.67532</td> <td>1.85152</td> <td>2.04624</td> <td>2.26145</td> <td>2.49928</td> <td>2.76212</td>	0.017		1.123	1.24111	1.37164	1.51589	1.67532	1.85152	2.04624	2.26145	2.49928	2.76212
	0.018	1.01715	1.12412	1.24235	1.37301	1.51741	1.677	1.85337	2.04829	2.26371	2.50178	2.76489
	0.019	1.01816	1.12525	1.24359	1.37438	1.51893	1.67868	1.85522	2.05034	2.26597	2.50429	2.76765
	0.02	1.01918	1.12637	1.24484	1.37576	1.52045	1.68036	1.85708	2.05239	2.26824	2.50679	2.77042
	0.021	1.0202	1.1275	1.24608	1.37714	1.52197	1.68204	1.85894	2.05445	2.27051	2.5093	2.77319
	0.022	1.02122	1.12863	1.24733	1.37851	1.52349	1.68372	1.8608	2.0565	2.27278	2.51181	2.77597
0.024												
0.025					l .							
0.026												
0.027         1.02634         1.13429         1.25358         1.38543         1.53113         1.69216         1.87013         2.06681         2.28418         2.5244         2.78988           0.028         1.02737         1.13542         1.25484         1.35661         1.3861         1.53267         1.69355         1.87388         2.07095         2.28875         2.52964         2.75269           0.03         1.02942         1.1377         1.25735         1.38959         1.53574         1.69725         1.87575         2.07302         2.29104         2.53199         2.79827           0.031         1.03045         1.13883         1.25661         1.39098         1.53777         1.69895         1.87763         2.0751         2.29334         2.53452         2.8010           0.031         1.03491         1.13997         1.25987         1.39237         1.54381         1.70005         1.8761         2.07718         2.29334         2.53452         2.8010           0.033         1.03458         1.41261         1.26393         1.39377         1.54035         1.70405         1.88791         2.07718         2.29563         2.53706         2.80666           0.034         1.03562         1.14444         1.26366         1.3548												
0.028         1.02737         1.13542         1.25484         1.38681         1.53267         1.69386         1.872         2.06888         2.28646         2.52693         2.79268           0.029         1.02844         1.13656         1.2561         1.3882         1.5342         1.69555         1.87388         2.07095         2.28875         2.29946         2.79547           0.031         1.03045         1.13883         1.25861         1.39998         1.53771         1.69895         1.87763         2.07302         2.29134         2.53199         2.79827           0.032         1.03149         1.13997         1.25987         1.39337         1.53881         1.70065         1.87763         2.0718         2.29563         2.53706         2.80661           0.034         1.03355         1.1411         1.26113         1.39377         1.54085         1.70056         1.88139         2.07925         2.29563         2.53706         2.80661           0.035         1.03458         1.1434         1.26391         1.39956         1.54189         1.70405         1.88716         2.08322         2.2953         2.5414         2.80948           0.032         1.03666         1.14569         1.39935         1.54639         1.70747<												
0.029         1.0284         1.13656         1.2561         1.3882         1.5342         1.69555         1.87388         2.07095         2.28875         2.52946         2.79547           0.031         1.02042         1.1377         1.25735         1.38959         1.53574         1.60725         1.87575         2.07302         2.29104         2.53192         2.79827           0.031         1.03045         1.13893         1.25881         1.39037         1.53881         1.70065         1.87571         2.07718         2.29533         2.53452         2.80107           0.033         1.03252         1.14111         1.26113         1.39377         1.54035         1.70235         1.88139         2.07925         2.29793         2.5396         2.80667           0.034         1.03355         1.14264         1.26299         1.39966         1.54189         1.70476         1.88516         2.08432         2.30253         2.54468         2.81229           0.035         1.03666         1.14454         1.26492         1.39976         1.54498         1.70747         1.88704         2.08483         2.54723         2.81151           0.037         1.03666         1.14569         1.26745         1.40075         1.54807         1.71												
0.03         1.02942         1.1377         1.25735         1.38959         1.53574         1.69725         1.87575         2.07302         2.29104         2.53199         2.79827           0.031         1.03045         1.13897         1.25861         1.39928         1.53727         1.69895         1.87763         2.07718         2.29363         2.53766         2.80387           0.032         1.03149         1.13997         1.25987         1.39237         1.53881         1.70065         1.87911         2.07718         2.29563         2.53706         2.80387           0.034         1.03355         1.14226         1.26239         1.39516         1.54189         1.70405         1.88319         2.07925         2.29793         2.5396         2.8066           0.035         1.03458         1.1434         1.26492         1.39766         1.54489         1.70747         1.88704         2.0855         2.30483         2.54148         2.8122           0.037         1.03666         1.14684         1.26619         1.39935         1.54653         1.70918         1.88893         2.08759         2.30714         2.54977         2.81792           0.039         1.03873         1.14798         1.26619         1.54962         1.712					1							
0.031         1.03045         1.13883         1.25861         1.39098         1.53727         1.69895         1.87763         2.0751         2.29334         2.53452         2.80107           0.032         1.03149         1.13997         1.25987         1.39237         1.53881         1.70065         1.87951         2.07718         2.29563         2.53706         2.80387           0.033         1.03252         1.14111         1.26113         1.39377         1.54085         1.70405         1.88139         2.07925         2.29793         2.5396         2.80667           0.034         1.03355         1.1426         1.26239         1.39566         1.54189         1.70405         1.88516         2.08342         2.30253         2.54214         2.80944           0.036         1.03562         1.14454         1.26691         1.39935         1.54683         1.70747         1.88704         2.0855         2.30483         2.54723         2.81513           0.037         1.03666         1.14569         1.26619         1.39935         1.54653         1.7018         1.88893         2.08759         2.30714         2.54977         2.81792           0.038         1.03679         1.14684         1.26745         1.40075         1.5					l .							1
0.032         1.03149         1.13997         1.25987         1.39237         1.53881         1.70065         1.87951         2.07718         2.29563         2.53706         2.80867           0.033         1.03252         1.14111         1.26113         1.39377         1.54035         1.70235         1.88139         2.07925         2.29793         2.5396         2.80664           0.034         1.03355         1.14226         1.26239         1.39516         1.54189         1.70405         1.88827         2.08133         2.30023         2.54214         2.80948           0.035         1.03458         1.14454         1.26366         1.39766         1.54484         1.70576         1.88516         2.08342         2.30253         2.54468         2.81229           0.036         1.03666         1.14569         1.26619         1.39935         1.54653         1.70918         1.88893         2.08759         2.30714         2.54977         2.81792           0.038         1.03769         1.14684         1.26745         1.40075         1.54807         1.71089         1.89082         2.08968         2.30945         2.55233         2.82072           0.041         1.04981         1.15028         1.27126         1.40216 <td< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td> </td><td></td></td<>												
0.033												
0.034         1.03355         1.14226         1.26239         1.39516         1.54189         1.70405         1.88327         2.08133         2.30023         2.54214         2.80948           0.035         1.03458         1.1434         1.26366         1.39656         1.54344         1.70576         1.88516         2.08342         2.30253         2.54468         2.81229           0.036         1.03562         1.14454         1.26492         1.39796         1.54489         1.70747         1.88704         2.0855         2.30483         2.54723         2.81511           0.037         1.03666         1.14569         1.26619         1.39935         1.54653         1.70918         1.88893         2.08769         2.30714         2.54977         2.81792           0.038         1.03779         1.14684         1.26872         1.40216         1.54962         1.7126         1.89271         2.09177         2.31176         2.55488         2.8356           0.04         1.03977         1.14913         1.26999         1.40356         1.55117         1.71431         1.89461         2.09366         2.31407         2.55744         2.82639           0.041         1.04081         1.15143         1.27381         1.40778         1.5												
0.035         1.03458         1.1434         1.26366         1.39656         1.54344         1.70576         1.88516         2.08342         2.30253         2.54468         2.81229           0.036         1.03562         1.14454         1.26492         1.39796         1.54498         1.70747         1.88704         2.0855         2.30483         2.54723         2.81511           0.037         1.03666         1.14569         1.26619         1.39935         1.54663         1.70918         1.88893         2.08759         2.30714         2.54977         2.81792           0.038         1.03769         1.14684         1.26745         1.400216         1.54962         1.7126         1.89271         2.09177         2.31176         2.55488         2.82356           0.04         1.03977         1.14913         1.26999         1.40356         1.55117         1.71431         1.89461         2.09366         2.31407         2.55744         2.82636           0.041         1.04081         1.15028         1.27126         1.40496         1.55733         1.71603         1.8965         2.09596         2.31639         2.55999         2.82922           0.042         1.04185         1.15143         1.27508         1.40778         1.												
0.036         1.03562         1.14454         1.26492         1.39796         1.54498         1.70747         1.88704         2.0855         2.30483         2.54723         2.81511           0.037         1.03666         1.14569         1.26619         1.39935         1.54653         1.70918         1.88893         2.08759         2.30714         2.54977         2.81792           0.038         1.03769         1.14684         1.26745         1.40075         1.54807         1.71089         1.89082         2.08968         2.30945         2.55233         2.82076           0.039         1.03873         1.14798         1.26872         1.40216         1.54962         1.71161         1.89271         2.09177         2.31176         2.55488         2.82356           0.041         1.03977         1.14913         1.268999         1.40356         1.55171         1.71431         1.89461         2.09386         2.31407         2.55744         2.82638           0.041         1.04081         1.15143         1.27253         1.40637         1.55428         1.71775         1.89841         2.09866         2.31871         2.56256         2.83205           0.042         1.04485         1.15434         1.27508         1.40919 <t< td=""><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td><td></td></t<>												
0.037         1.03666         1.14569         1.26619         1.39935         1.54653         1.70918         1.88893         2.08759         2.30714         2.54977         2.81792           0.038         1.03769         1.14684         1.26745         1.40075         1.54807         1.71089         1.89082         2.08968         2.30945         2.55233         2.82074           0.039         1.03873         1.14798         1.26872         1.40216         1.54962         1.7126         1.89271         2.09177         2.31176         2.55488         2.82356           0.04         1.03977         1.14913         1.26999         1.40496         1.55273         1.71603         1.8965         2.09956         2.31407         2.55744         2.8263           0.041         1.04081         1.15028         1.27126         1.40496         1.55273         1.71603         1.8965         2.09956         2.31639         2.55999         2.82922           0.042         1.04185         1.15258         1.27381         1.40778         1.55848         1.71775         1.8984         2.09866         2.31871         2.56256         2.83205           0.043         1.04498         1.15274         1.40778         1.55584         1.71					I							
0.038         1.03769         1.14684         1.26745         1.40075         1.54807         1.71089         1.89082         2.08968         2.30945         2.55233         2.82074           0.039         1.03873         1.14798         1.26872         1.40216         1.54962         1.7126         1.89271         2.09177         2.31176         2.55488         2.82356           0.04         1.03977         1.14913         1.26999         1.40356         1.55117         1.71431         1.89461         2.09386         2.31407         2.55744         2.8263           0.041         1.04081         1.15028         1.27126         1.40496         1.55273         1.71603         1.8965         2.09596         2.31639         2.55999         2.82922           0.042         1.04185         1.15143         1.27253         1.40637         1.55428         1.71775         1.8984         2.09806         2.31871         2.56256         2.83208           0.043         1.04289         1.15588         1.27381         1.40778         1.55584         1.71946         1.9003         2.10016         2.32135         2.56762         2.83056           0.044         1.04498         1.155489         1.27536         1.40919         1.5					1							
0.039         1.03873         1.14798         1.26872         1.40216         1.54962         1.7126         1.89271         2.09177         2.31176         2.55488         2.82356           0.04         1.03977         1.14913         1.26999         1.40356         1.55117         1.71431         1.89461         2.09386         2.31407         2.55744         2.82638           0.041         1.04081         1.15028         1.27126         1.40496         1.55273         1.71603         1.8965         2.09596         2.31639         2.55999         2.82922           0.042         1.04185         1.15143         1.27253         1.40637         1.55428         1.71775         1.8984         2.09806         2.31871         2.56256         2.83205           0.043         1.04289         1.15258         1.27381         1.40778         1.55584         1.71946         1.9003         2.10016         2.32103         2.56512         2.83488           0.044         1.04394         1.15489         1.27636         1.40919         1.55739         1.72191         1.9022         2.10266         2.3235         2.57026         2.84056           0.045         1.04498         1.15489         1.27636         1.41041         1.560												
0.04         1.03977         1.14913         1.26999         1.40356         1.55117         1.71431         1.89461         2.09386         2.31407         2.55744         2.82638           0.041         1.04081         1.15028         1.27126         1.40496         1.55273         1.71603         1.8965         2.09596         2.31639         2.55999         2.82922           0.042         1.04185         1.15143         1.27253         1.40637         1.55428         1.71775         1.8984         2.09806         2.31871         2.56256         2.83205           0.043         1.04289         1.15258         1.27381         1.40778         1.55584         1.71946         1.9003         2.10016         2.32103         2.56512         2.83488           0.044         1.04394         1.15374         1.27508         1.40919         1.55739         1.72119         1.9022         2.10226         2.32335         2.56769         2.83772           0.045         1.04498         1.15489         1.27636         1.4106         1.55895         1.72291         1.90411         2.10436         2.32567         2.57026         2.84056           0.049         1.04707         1.1572         1.27891         1.41484         1.560	0.038	1.03769	1.14684	1.26745	1.40075	1.54807	1.71089	1.89082	2.08968	2.30945	2.55233	2.82074
0.041         1.04081         1.15028         1.27126         1.40496         1.55273         1.71603         1.8965         2.09596         2.31639         2.55999         2.82922           0.042         1.04185         1.15143         1.27253         1.40637         1.55428         1.71775         1.8984         2.09806         2.31871         2.56256         2.83205           0.043         1.04289         1.15258         1.27381         1.40778         1.55584         1.71946         1.9003         2.10016         2.32103         2.56512         2.83488           0.044         1.04394         1.15374         1.27508         1.40919         1.55739         1.72119         1.9022         2.1026         2.32335         2.56769         2.83772           0.045         1.04498         1.15489         1.27636         1.4106         1.55895         1.72291         1.90411         2.10436         2.32567         2.57026         2.84056           0.046         1.04603         1.1572         1.27891         1.41342         1.56051         1.72463         1.90601         2.10647         2.328         2.57283         2.8434           0.049         1.04917         1.15752         1.28148         1.41625         1.5652 </td <td>0.039</td> <td>1.03873</td> <td>1.14798</td> <td>1.26872</td> <td>1.40216</td> <td>1.54962</td> <td>1.7126</td> <td>1.89271</td> <td>2.09177</td> <td>2.31176</td> <td>2.55488</td> <td>2.82356</td>	0.039	1.03873	1.14798	1.26872	1.40216	1.54962	1.7126	1.89271	2.09177	2.31176	2.55488	2.82356
0.042         1.04185         1.15143         1.27253         1.40637         1.55428         1.71775         1.8984         2.09806         2.31871         2.56256         2.83205           0.043         1.04289         1.15258         1.27381         1.40778         1.55584         1.71946         1.9003         2.10016         2.32103         2.56512         2.83488           0.044         1.04394         1.15374         1.27508         1.40919         1.55739         1.72119         1.9022         2.10226         2.32335         2.56769         2.83772           0.045         1.04498         1.15489         1.27636         1.4106         1.55895         1.72291         1.90411         2.10436         2.32567         2.57026         2.84056           0.046         1.04603         1.15605         1.27764         1.41201         1.56051         1.72463         1.90601         2.10847         2.328         2.57283         2.8434           0.047         1.04707         1.1572         1.27891         1.41342         1.566207         1.72636         1.90792         2.10857         2.33033         2.5754         2.84624           0.049         1.04917         1.15952         1.28148         1.41625         1.5662	0.04	1.03977	1.14913	1.26999	1.40356	1.55117	1.71431	1.89461	2.09386	2.31407	2.55744	2.82639
0.043         1.04289         1.15258         1.27381         1.40778         1.55584         1.71946         1.9003         2.10016         2.32103         2.56512         2.83488           0.044         1.04394         1.15374         1.27508         1.40919         1.55739         1.72119         1.9022         2.10226         2.32335         2.56769         2.83772           0.045         1.04498         1.15489         1.27636         1.4106         1.55895         1.72291         1.90411         2.10436         2.32567         2.57026         2.84056           0.046         1.04603         1.15605         1.27764         1.41201         1.56051         1.72463         1.90601         2.10647         2.328         2.57283         2.8434           0.047         1.04707         1.1572         1.27891         1.41342         1.56207         1.72636         1.90792         2.10857         2.33033         2.5754         2.84624           0.048         1.04812         1.15836         1.28019         1.41484         1.56324         1.72982         1.91174         2.1128         2.335         2.58056         2.85194           0.05         1.05022         1.16068         1.28276         1.41767         1.56677 <td>0.041</td> <td>1.04081</td> <td>1.15028</td> <td>1.27126</td> <td>1.40496</td> <td>1.55273</td> <td>1.71603</td> <td>1.8965</td> <td>2.09596</td> <td>2.31639</td> <td>2.55999</td> <td>2.82922</td>	0.041	1.04081	1.15028	1.27126	1.40496	1.55273	1.71603	1.8965	2.09596	2.31639	2.55999	2.82922
0.044         1.04394         1.15374         1.27508         1.40919         1.55739         1.72119         1.9022         2.10226         2.32335         2.56769         2.83772           0.045         1.04498         1.15489         1.27636         1.4106         1.55895         1.72291         1.90411         2.10436         2.32567         2.57026         2.84056           0.046         1.04603         1.15605         1.27764         1.41201         1.56051         1.72463         1.90601         2.10647         2.328         2.57283         2.8434           0.047         1.04707         1.1572         1.27891         1.41342         1.56207         1.72636         1.90792         2.10857         2.33033         2.5754         2.84624           0.048         1.04812         1.15836         1.28019         1.41484         1.56364         1.72809         1.90983         2.11068         2.33266         2.57798         2.84909           0.049         1.04917         1.15952         1.28148         1.41625         1.5652         1.72982         1.91174         2.1128         2.335         2.58056         2.85194           0.051         1.05127         1.16184         1.28404         1.41909         1.56834 </td <td>0.042</td> <td>1.04185</td> <td>1.15143</td> <td>1.27253</td> <td>1.40637</td> <td>1.55428</td> <td>1.71775</td> <td>1.8984</td> <td>2.09806</td> <td>2.31871</td> <td>2.56256</td> <td>2.83205</td>	0.042	1.04185	1.15143	1.27253	1.40637	1.55428	1.71775	1.8984	2.09806	2.31871	2.56256	2.83205
0.045         1.04498         1.15489         1.27636         1.4106         1.55895         1.72291         1.90411         2.10436         2.32567         2.57026         2.84056           0.046         1.04603         1.15605         1.27764         1.41201         1.56051         1.72463         1.90601         2.10647         2.328         2.57283         2.8434           0.047         1.04707         1.1572         1.27891         1.41342         1.56207         1.72636         1.90792         2.10857         2.33033         2.5754         2.84624           0.048         1.04812         1.15836         1.28019         1.41484         1.56364         1.72809         1.90983         2.11068         2.33266         2.57798         2.84909           0.049         1.04917         1.15952         1.28148         1.41625         1.5652         1.72982         1.91174         2.1128         2.335         2.58056         2.85194           0.05         1.05022         1.16068         1.28276         1.41767         1.56677         1.73155         1.91365         2.11491         2.33733         2.58514         2.85479           0.051         1.05127         1.16184         1.28404         1.41909         1.56834 </td <td>0.043</td> <td>1.04289</td> <td>1.15258</td> <td>1.27381</td> <td>1.40778</td> <td>1.55584</td> <td>1.71946</td> <td>1.9003</td> <td>2.10016</td> <td>2.32103</td> <td>2.56512</td> <td>2.83488</td>	0.043	1.04289	1.15258	1.27381	1.40778	1.55584	1.71946	1.9003	2.10016	2.32103	2.56512	2.83488
0.046         1.04603         1.15605         1.27764         1.41201         1.56051         1.72463         1.90601         2.10647         2.328         2.57283         2.8434           0.047         1.04707         1.1572         1.27891         1.41342         1.56207         1.72636         1.90792         2.10857         2.33033         2.5754         2.84624           0.048         1.04812         1.15836         1.28019         1.41484         1.56364         1.72809         1.90983         2.11068         2.33266         2.57798         2.84908           0.049         1.04917         1.15952         1.28148         1.41625         1.5652         1.72982         1.91174         2.1128         2.335         2.58056         2.85194           0.05         1.05022         1.16068         1.28276         1.41767         1.56677         1.73155         1.91365         2.11491         2.33733         2.58314         2.85476           0.051         1.05127         1.16184         1.28404         1.41909         1.56834         1.73328         1.91557         2.11703         2.33967         2.58572         2.85765           0.052         1.05232         1.16301         1.28533         1.42051         1.56991<	0.044	1.04394	1.15374	1.27508	1.40919	1.55739	1.72119	1.9022	2.10226	2.32335	2.56769	2.83772
0.046         1.04603         1.15605         1.27764         1.41201         1.56051         1.72463         1.90601         2.10647         2.328         2.57283         2.8434           0.047         1.04707         1.1572         1.27891         1.41342         1.56207         1.72636         1.90792         2.10857         2.33033         2.5754         2.84624           0.048         1.04812         1.15836         1.28019         1.41484         1.56364         1.72809         1.90983         2.11068         2.33266         2.57798         2.84908           0.049         1.04917         1.15952         1.28148         1.41625         1.5652         1.72982         1.91174         2.1128         2.335         2.58056         2.85194           0.05         1.05022         1.16068         1.28276         1.41767         1.56677         1.73155         1.91365         2.11491         2.33733         2.58314         2.85476           0.051         1.05127         1.16184         1.28404         1.41909         1.56834         1.73328         1.91557         2.11703         2.33967         2.58572         2.85765           0.052         1.05232         1.16301         1.28533         1.42051         1.56991<	0.045	1.04498	1.15489	1.27636	1.4106	1.55895	1.72291	1.90411	2.10436	2.32567	2.57026	2.84056
0.047         1.04707         1.1572         1.27891         1.41342         1.56207         1.72636         1.90792         2.10857         2.33033         2.5754         2.84624           0.048         1.04812         1.15836         1.28019         1.41484         1.56364         1.72809         1.90983         2.11068         2.33266         2.57798         2.84909           0.049         1.04917         1.15952         1.28148         1.41625         1.5652         1.72982         1.91174         2.1128         2.335         2.58056         2.85194           0.05         1.05022         1.16068         1.28276         1.41767         1.56677         1.73155         1.91365         2.11491         2.33733         2.58314         2.85479           0.051         1.05127         1.16184         1.28404         1.41909         1.56834         1.73328         1.91557         2.11703         2.33967         2.58572         2.85765           0.052         1.05232         1.16301         1.28533         1.42051         1.56991         1.73501         1.91749         2.11915         2.34201         2.58831         2.86051           0.053         1.05338         1.16417         1.28661         1.42193         1.571	0.046	1.04603	1.15605	1.27764	1.41201	1.56051	1.72463	1.90601		2.328	2.57283	2.8434
0.048         1.04812         1.15836         1.28019         1.41484         1.56364         1.72809         1.90983         2.11068         2.33266         2.57798         2.84908           0.049         1.04917         1.15952         1.28148         1.41625         1.5652         1.72982         1.91174         2.1128         2.335         2.58056         2.85194           0.05         1.05022         1.16068         1.28276         1.41767         1.56677         1.73155         1.91365         2.11491         2.33733         2.58314         2.85479           0.051         1.05127         1.16184         1.28404         1.41909         1.56834         1.73328         1.91557         2.11703         2.33967         2.58572         2.85765           0.052         1.05232         1.16301         1.28533         1.42051         1.56991         1.73501         1.91749         2.11915         2.34201         2.58831         2.86051           0.053         1.05338         1.16417         1.28661         1.42193         1.57148         1.73675         1.9194         2.12127         2.34436         2.5909         2.86337           0.054         1.05443         1.16533         1.2879         1.42378         1.5746	0.047										2.5754	2.84624
0.049         1.04917         1.15952         1.28148         1.41625         1.5652         1.72982         1.91174         2.1128         2.335         2.58056         2.85194           0.05         1.05022         1.16068         1.28276         1.41767         1.56677         1.73155         1.91365         2.11491         2.33733         2.58314         2.85479           0.051         1.05127         1.16184         1.28404         1.41909         1.56834         1.73328         1.91557         2.11703         2.33967         2.58572         2.85765           0.052         1.05232         1.16301         1.28533         1.42051         1.56991         1.73501         1.91749         2.11915         2.34201         2.58831         2.86051           0.053         1.05338         1.16417         1.28661         1.42193         1.57148         1.73675         1.9194         2.12127         2.34436         2.5909         2.86337           0.054         1.05443         1.16533         1.2879         1.42335         1.57305         1.73849         1.92133         2.12339         2.3467         2.59349         2.86624           0.055         1.05548         1.1665         1.28919         1.42478         1.5762 </td <td></td>												
0.05         1.05022         1.16068         1.28276         1.41767         1.56677         1.73155         1.91365         2.11491         2.33733         2.58314         2.85479           0.051         1.05127         1.16184         1.28404         1.41909         1.56834         1.73328         1.91557         2.11703         2.33967         2.58572         2.85768           0.052         1.05232         1.16301         1.28533         1.42051         1.56991         1.73501         1.91749         2.11915         2.34201         2.58831         2.86051           0.053         1.05338         1.16417         1.28661         1.42193         1.57148         1.73675         1.9194         2.12127         2.34436         2.5909         2.86337           0.054         1.05443         1.16533         1.2879         1.42335         1.57305         1.73849         1.92133         2.12339         2.3467         2.59349         2.86624           0.055         1.05548         1.1665         1.28919         1.42478         1.57462         1.74023         1.92325         2.12551         2.34905         2.59609         2.8691           0.056         1.05654         1.16884         1.29177         1.42763         1.577												
0.051         1.05127         1.16184         1.28404         1.41909         1.56834         1.73328         1.91557         2.11703         2.33967         2.58572         2.85768           0.052         1.05232         1.16301         1.28533         1.42051         1.56991         1.73501         1.91749         2.11915         2.34201         2.58831         2.86051           0.053         1.05338         1.16417         1.28661         1.42193         1.57148         1.73675         1.9194         2.12127         2.34436         2.5909         2.86337           0.054         1.05443         1.16533         1.2879         1.42335         1.57305         1.73849         1.92133         2.12339         2.3467         2.59349         2.86624           0.055         1.05548         1.1665         1.28919         1.42478         1.57462         1.74023         1.92325         2.12551         2.34905         2.59609         2.8691           0.056         1.05654         1.16767         1.29048         1.4262         1.5762         1.74197         1.92517         2.12764         2.3514         2.59869         2.87198           0.057         1.0576         1.16884         1.29177         1.42763         1.57778<												
0.052         1.05232         1.16301         1.28533         1.42051         1.56991         1.73501         1.91749         2.11915         2.34201         2.58831         2.86051           0.053         1.05338         1.16417         1.28661         1.42193         1.57148         1.73675         1.9194         2.12127         2.34436         2.5909         2.86337           0.054         1.05443         1.16533         1.2879         1.42335         1.57305         1.73849         1.92133         2.12339         2.3467         2.59349         2.86624           0.055         1.05548         1.1665         1.28919         1.42478         1.57462         1.74023         1.92325         2.12551         2.34905         2.59609         2.8691           0.056         1.05654         1.16767         1.29048         1.4262         1.5762         1.74197         1.92517         2.12764         2.3514         2.59869         2.87198           0.057         1.0576         1.16884         1.29177         1.42763         1.57778         1.74371         1.9271         2.12977         2.35375         2.60129         2.87485												
$ \begin{array}{ c c c c c c c c c c c c c c c c c c c$												
0.054         1.05443         1.16533         1.2879         1.42335         1.57305         1.73849         1.92133         2.12339         2.3467         2.59349         2.86624           0.055         1.05548         1.1665         1.28919         1.42478         1.57462         1.74023         1.92325         2.12551         2.34905         2.59609         2.8691           0.056         1.05654         1.16767         1.29048         1.4262         1.5762         1.74197         1.92517         2.12764         2.3514         2.59869         2.87198           0.057         1.0576         1.16884         1.29177         1.42763         1.57778         1.74371         1.9271         2.12977         2.35375         2.60129         2.87488												
0.055         1.05548         1.1665         1.28919         1.42478         1.57462         1.74023         1.92325         2.12551         2.34905         2.59609         2.8691           0.056         1.05654         1.16767         1.29048         1.4262         1.5762         1.74197         1.92517         2.12764         2.3514         2.59869         2.87198           0.057         1.0576         1.16884         1.29177         1.42763         1.57778         1.74371         1.9271         2.12977         2.35375         2.60129         2.87485												
0.056         1.05654         1.16767         1.29048         1.4262         1.5762         1.74197         1.92517         2.12764         2.3514         2.59869         2.87198           0.057         1.0576         1.16884         1.29177         1.42763         1.57778         1.74371         1.9271         2.12977         2.35375         2.60129         2.87485					I							
0.057   1.0576   1.16884   1.29177   1.42763   1.57778   1.74371   1.9271   2.12977   2.35375   2.60129   2.87485												
												2.87485