**Дискретная математика**

Домашнее задание №8

«Деление чисел с плавающей запятой»

Вариант №

Выполнил: (гр. P31)

Варианты задания

|  |  |
| --- | --- |
| ***A*** | ***B*** |
| 1,4 | 0,017 |

Ход работы

**#1**

1. Формат *Ф1*

*А* = (1,4)10 = (1,(6))16 = (0,1(6))16 · 161

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 |

*В* = (0,017)10 = (0,045A…)16 = (0,45A…)16 · 16-1

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 0 | 1 | 1 | 1 | 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 1 |

1. Формат *Ф2*

*А* = (1,4)10 = (1,(0110))2 = (0,1(0110))2 · 21

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 1 | 0 | 0 | 1 | 1 |

*В* = (0,017)10 = (0,000(0010))2 = (0,(1000))2 · 2-5

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 0 | 1 | 1 | 1 | 1 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 |

**#2, 3, 5**

*XC* = *XA – XB + d*

*d* + P*C* = **P*A* + *d* – PB –d** *+ d*

**P*C***

*XC* = 1 – (-1) + 64 = 66

P*C* = 2

|  |  |  |  |
| --- | --- | --- | --- |
| **N шага** | **Действие** | **Делимое** | **Частное** |
| **0** | *МА*  [-*МB*]доп  *R0* | **0 0 0 0 1 0 1 1 0**  **1 1 0 1 1 1 0 1 1**  **1 1 1 0 1 0 0 0 1** | **0 0 0 0 0 0 0 0**  **R0<0**  **1 1 0 0 0 0 0 0** |
| **1** | ←*R0*  *МB* пр  *R1* | **1 1 0 1 0 0 0 1 1**  **0 0 1 0 0 0 1 0 1**  **1 1 1 1 0 1 0 0 0** | **1 0 0 0 0 0 0 0**  **1 0 0 0 0 0 0 0** |
| **2** | ←*R1*  *МB* пр  *R2* | **1 1 1 0 1 0 0 0 1**  **0 0 1 0 0 0 1 0 1**  **0 0 0 0 1 0 1 1 0** | **0 0 0 0 0 0 0 0**  **0 0 0 0 0 0 0 1** |
| **3** | ←R2  [-*МB*]доп  R3 | **0 0 0 1 0 1 1 0 0**  **1 1 0 1 1 1 0 1 1**  **1 1 1 1 0 0 1 1 1** | **0 0 0 0 0 0 1 0**  **0 0 0 0 0 0 1 0** |
| **4** | ←*R3*  *МB* пр  *R4* | **1 1 1 0 0 1 1 1 0**  **0 0 1 0 0 0 1 0 1**  **0 0 0 0 1 0 0 1 1** | **0 0 0 0 0 1 0 0**  **0 0 0 0 0 1 0 1** |
| **5** | ←*R4*  [-*МB*]доп  *R5* | **0 0 0 1 0 0 1 1 0**  **1 1 0 1 1 1 0 1 1**  **1 1 1 1 0 0 0 0 1** | **0 0 0 0 1 0 1 0**  **0 0 0 0 1 0 1 0** |
| **6** | ←*R*5  *МB* пр  *R6* | **1 1 1 0 0 0 0 1 0**  **0 0 1 0 0 0 1 0 1**  **0 0 0 0 0 0 1 1 1** | **0 0 0 1 0 1 0 0**  **0 0 0 1 0 1 0 1** |
| **7** | ←*R6*  [-*МB*]доп  *R7* | **0 0 0 0 0 1 1 1 0**  **1 1 0 1 1 1 0 1 1**  **1 1 1 0 0 1 0 0 1** | **0 0 1 0 1 0 1 0**  **0 0 1 0 1 0 1 0** |
| **8** | ←*R7*  *МB* пр  *R8* | **1 1 0 0 1 0 0 1 0**  **0 0 1 0 0 0 1 0 1**  **1 1 1 0 1 0 1 1 1** | **0 1 0 1 0 1 0 0**  **0 1 0 1 0 1 0 0** |

*С\** = (5,4)16 · 21 = (54)2 = 84.

СТ = 82.35294118 (точное значение).

Определим абсолютную и относительную погрешности результата:

С = 82.35294118 – 84 = -1.64705882

δ*С* = · 100% = 0,02%

Погрешность вызвана неточным представлением операндов.

**#4, 5**

*XC* = *XA – XB + d*

*d* + P*C* = **P*A* + *d* – PB –d** *+ d*

**P*C***

*XC* = 1 – (-5) + 128 = 135

P*C* = 7

|  |  |  |  |
| --- | --- | --- | --- |
| **N шага** | **Действие** | **Делимое** | **Частное** |
| **0** | *МА*  [-*МB*]доп  *R*0 | **0 1 0 1 1 0 0 1 1**  **1 0 1 1 1 1 0 0 0**  **0 0 0 1 0 1 0 1 1** | **0 0 0 0 0 0 0 0**  **0 0 0 0 0 0 0 1** |
| **1** | ←*R*0  [-*МB*]доп  *R*1 | **0 0 1 0 1 0 1 1 0**  **1 0 1 1 1 1 0 0 0**  **1 1 1 0 0 1 1 1 0** | **0 0 0 0 0 0 1 0**  **0 0 0 0 0 0 1 0** |
| **2** | ←*R*1  *МB* пр  *R*2 | **1 1 0 0 1 1 1 0 0**  **0 1 0 0 0 1 0 0 0**  **0 0 0 1 0 0 1 0 0** | **0 0 0 0 0 1 0 0**  **0 0 0 0 0 1 0 1** |
| **3** | ←*R*2  [*-МB*] доп  *R*3 | **0 0 1 0 0 1 0 0 0**  **1 0 1 1 1 1 0 0 0**  **1 1 0 1 0 0 0 0 0** | **0 0 0 0 1 0 1 0**  **0 0 0 0 1 0 1 0** |
| **4** | ←R3  *МВ* пр  *R*4 | **1 0 1 0 0 0 0 0 0**  **0 1 0 0 0 1 0 0 0**  **1 1 1 0 0 1 0 0 0** | **0 0 0 1 0 1 0 0**  **0 0 0 1 0 1 0 0** |
| **5** | ←*R*4  *МB* пр  *R*5 | **1 1 0 0 1 0 0 0 0**  **0 1 0 0 0 1 0 0 0**  **0 0 0 0 1 1 0 0 0** | **0 0 1 0 1 0 0 0**  **0 0 1 0 1 0 0 1** |
| **6** | ←*R*5  [-*МB*] пр  *R*6 | **0 0 0 1 1 0 0 0 0**  **1 0 1 1 1 1 0 0 0**  **1 1 0 1 0 1 0 0 0** | **0 1 0 1 0 0 1 0**  **0 1 0 1 0 0 1 0** |
| **7** | ←*R*6  *МB* пр  *R*7  *МС*→ | **1 0 1 0 1 0 0 0 0**  **0 1 0 0 0 1 0 0 0**  **1 1 1 0 1 1 0 0 0** | **1 0 1 0 0 1 0 0**  **1 0 1 0 0 1 0 1**  **0 1 0 1 0 0 1 0 1** |

С*\** = (0,10100101)2 · 27 = (1010010,1)2 = 82,5.

СТ = 82.35294118 (точное значение).

Определим абсолютную и относительную погрешности результата:

Δ*С* = 82.35294118 – 82,5 = -0,14705882

δ*С* = · 100% = 0,002%

Погрешность вызвана неточным представлением операндов.

**#6**

Погрешности результатов вызваны неточным представлением операндов. В формате *Ф2* операнды представлены точнее и погрешность меньше.