**Дискретная математика**

Домашнее задание №8

«Деление чисел с плавающей запятой»

Вариант №87

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Варианты задания

|  |  |
| --- | --- |
| ***A*** | ***B*** |
| 3,8 | 0,043 |

Ход работы

**#1**

1. Формат *Ф1*

*А* = (3,8)10 = (3,(С))16 = (0.3(С))16 · 161

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

*В* = (0,043)10 = (0,0B0)16 = (0,B0)16 · 16-1

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

1. Формат *Ф2*

*А* = (3,8)10 = (11,11001100110)2 = (0,1111001100110)2 · 22

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

*В* = (0,043)10 = (0,00001011000)2 = (0,1011000)2 · 2-4

|  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- | --- |
| 0 | 0 | 1 | 1 | 1 | 1 | 1 | 0 | 0 | 0 | 1 | 1 | 0 | 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 1 1 1 1 0 0**  **1 0 1 0 1 0 0 0 0**  **1 1 0 0 0 1 1 0 0** | **0 0 0 0 0 0 0 0**  **R0 < 0**  **0 0 0 0 0 0 0 0** |
| **1** | ←*R0*  [*МB*]пр  *R1* | **1 0 0 0 1 1 0 0 0**  **0 1 0 1 1 0 0 0 0**  **1 1 1 0 0 1 0 0 0** | **0 0 0 0 0 0 0 | 0**  **0 0 0 0 0 0 0 | 0** |
| **2** | ←*R1*  *[МB]пр*  *R2* | **1 1 0 0 1 0 0 0 0**  **0 1 0 1 1 0 0 0 0**  **0 0 1 0 0 0 0 0 0** | **0 0 0 0 0 0 | 0 0**  **0 0 0 0 0 0 | 0 1** |
| **3** | ←R2  *[-МB]доп*  R3 | **0 1 0 0 0 0 0 0 0**  **1 0 1 0 1 0 0 0 0**  **1 1 1 0 1 0 0 0 0** | **0 0 0 0 0 | 0 1 0**  **0 0 0 0 0 | 0 1 0** |
| **4** | ←*R3*  *[МB]пр*  *R4* | **1 1 0 1 0 0 0 0 0**  **0 1 0 1 1 0 0 0 0**  **0 0 1 0 1 0 0 0 0** | **0 0 0 0 | 0 1 0 0**  **0 0 0 0 | 0 1 0 1** |
| **5** | ←*R4*  *[-МB]доп*  *R5* | **0 1 0 1 0 0 0 0 0**  **1 0 1 0 1 0 0 0 0**  **1 1 1 1 1 0 0 0 0** | **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 1 0 0 0 0 0**  **0 1 0 1 1 0 0 0 0**  **0 1 0 0 1 0 0 0 0** | **0 0 | 0 1 0 1 0 0**  **0 0 | 0 1 0 1 0 1** |
| **7** | ←*R6*  *[-МB]доп*  *R7* | **1 0 0 1 0 0 0 0 0**  **1 0 1 0 1 0 0 0 0**  **0 0 1 1 1 0 0 0 0** | **0 | 0 1 0 1 0 1 0**  **0 | 0 1 0 1 0 1 1** |
| **8** | ←*R7*  *[-МB]доп*  *R8* | **0 1 1 1 0 0 0 0 0**  **1 0 1 0 1 0 0 0 0**  **0 0 0 1 1 0 0 0 0** | **0 1 0 1 0 1 1 0**  **0 1 0 1 0 1 1 1** |

*С\** = (5,7)16 · 161 = (57)16 = 87.

СТ = 88.3722093 (точное значение).

Определим абсолютную и относительную погрешности результата:

С = 88.3722093 – 87 = 1,3722093

δ*С* = (1,3722093 / 88,3722093) · 100% = 1,55%

Погрешность вызвана неточным представлением операндов.

**#4, 5**

*XC* = *XA – XB + d*

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

**P*C***

*XC* = 2 – (-4) + 128 = 134

P*C* = 6

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

С*\** = (0,10110001)2 · 27 = (1011000,1)2 = 88,5.

СТ = 88.3722093 (точное значение).

Определим абсолютную и относительную погрешности результата:

*С* = 88.3722093 – 88,5 = −0,1277907

δ*С* = (−0,1277907 / 88,5) · 100% = 0,145%

Погрешность вызвана неточным представлением операндов.

**#6**

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