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**Домашняя работа №6**

по дисциплине “Дискретная математика”

вариант 10

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|  |  |
| --- | --- |
| А | В |
| 30,84 | 11,45 |

A = 30,84

B = 11,45

1. Формат Ф1 (число разрядов мантиссы m = 12)

А = 30,8410 = 1Е.D16 \* 160

М*А*

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

**1** округление к ближайшему

0 1 7 8 19

*В* = 11,4510 = B.7316 = (B,(73))16 · 161

M*B*

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

**1** округление к ближайшему

0 1  7 8 19

1) *XA* = 1 0 0 0 0 0 0

*XB* = 1 0 0 0 0 0 0

(*XA-XB*)доп.= 0 0 0 0 0 0 0

(*XA-XB*). = 0; *ХС = ХВ =* 0*.*

а) Оба операнда положительные(A > 0, B > 0):

М*А* = . 1 1 0 1 0 1 1 1 0 0 0 0

+

М*В* = . 0 1 1 1 0 0 1 1 0 1 0 0

М*С* = 1. 1 0 0 0 1 0 1 0 0 1 0 0

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

*С*

0 1  7 8 19

*С*\* = М*С* · 16Р*с* = (1,08)16 · 160 = (1,08)16 = 1,03125

Δ*С* = *С*Т - *С*\* = 1,031–1,03125 = -0,00025,

где Δ*С* –абсолютная погрешность;

*С*Т –точное значение;

*С*\* - приближенное значение.

δ*С* = · 100% = . 100% = 0,024%,

где δ*С* – относительная погрешность.

б) Первый операнд отрицательный, второй положительный (A < 0, B > 0)

4

2,3) М*В* = . 0 0 1 0 1 0 0 0 1 1 0 0

М*А* = . 1 0 0 0 1 1 0 0 1 0 0 0

М*С* = 1. 1 1 0 1 0 1 0 0 1 0 0 0

Результат сложения нормализован.

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

*С*

0 1  7 8 19

*С*\* = М*С* · 16Р*с* = (0,D28)16 · 160 = (0, D28)16 = 0.822265625.

Δ*С* = *С*Т - *С*\* = 0.822265625– 0.82225 = -0,000015625,

δ*С* = · 100% = = 0,0019%.

в) Первый операнд отрицательный, второй положительный(A < 0, B > 0)

М*В* = .1 1 0 1 0 1 1 1 0 0 0 0

М*А* = . 1 0 0 0 1 1 0 0 1 0 0 0

М*С* = 1. 1 1 1 1 0 0 1 1 1 0 0 0

Результат сложения нормализован.

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

*С*

0 1  7 8 19

*С*\* = М*С* · 16Р*с* = (-0,D28)16 · 160 = (-0,D28)16 = -0. 822265625.

Δ*С* = *С*Т - *С*\* = -0,822265625+ 0.82225 = 0,000015625,

δ*С* = · 100% = = 0,0019%.

1. Формат Ф2

*А* = 30,8410 = (1E,D70)16 = (0.1111011010111)2 · 2-5

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

19 18 11 10 0  
*В* = 11,4510 = (B,73)16 = (0,101101110011)2 · 2-1

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

19 18 11 10 0

*XA* = 0 1 1 1 1 1 1 0

*XB* = 1 0 0 0 0 0 0 0

(*XA-XB*)доп.= 1 1 1 1 1 1 1 0

(*XA-XB*). = -5; *ХС = ХВ* = -1*.*

а) Оба операнда положительные ( A > 0, B > 0)

М*А* = . 1 1 1 1 0 1 0 1 0 1 1 1

+

М*В* = . 1 0 1 1 0 1 1 1 0 0 1 1

М*С* = 1 . 1 0 1 0 1 1 0 0 1 0 1 0

2

М*С* = 0 .0 1 0 1 0 1 1 0 0 1 0 1 0

Т.к. выполнен сдвиг мантиссы влево, то характеристику результата нужно увеличить на 1 (*ХС* = *ХС* +1 = 1).

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

*С*

19 18 11 10 0

*С*\* = М*С* · 2Р*с* = (0,100001000100)2 · 21 = (1.00001000100)2 = 1.033203125.

Δ*С* = *С*Т - *С*\* = 1,031 – 1.033203125 = -0,002203125,

δ*С* = · 100% = \* 100% = 0,21%.

б) Первая операнда меньше 0, вторая больше( A < 0, B > 0 )

М*А* = . 0 0 0 0 1 0 1 0 0 0 0 1

+

М*В* = . 1 0 1 1 0 1 1 1 0 0 1 1

М*С* = 0 . 1 0 0 0 0 0 0 1 0 1 0 0

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

*С*

19 18 11 10 0

*С*\* = М*С* · 2Р*с* = (0.100000010100)2 · 20 = (0.100000010100) = 0.5048828125

Δ*С* = *С*Т - *С*\* = 0,541 – 0.5048828125= 0.036117187500000036.

δ*С* = · 100% = \* 100% = 0,66%.

в) Первая операнда больше 0, вторая меньше( A > 0, B < 0 )

М*В* = . 1 1 1 1 0 1 1 1 0 1 1 1  
М*А* = . 0 1 0 0 1 0 0 0 1 1 0 1

М*С* = 0 . 1 0 1 0 0 0 0 0 0 1 0 0

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

*С*

19 18 11 10 0

*С*\* = М*С* · 2Р*с* = (0. 100000010100)· 20 = (0. 100000010100)2 = -0.5048828125.

Δ*С* = *С*Т - *С*\* = -0.541 + 0.5048828125= -0.036117187500000036.

δ*С* = · 100% = \* 100% = 0,66%.