Вариант :103

***А* = 18,87; *В* = 13,28.**

1. Формат *Ф1*

*А* = (18,87)10 = (12.DEB8) 16 =(0.12DEB8)16 · 162

М*А*

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

**1** округление к ближайшему

0 1 7 8 19  
*В* = (13,28)10 = (D.47AE)16 = (0,D47AE)16 · 161

M*B*

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

**1** округление к ближайшему

0 1  7 8 19

1) *XA* = \_1 0 0 0 0 1 0

*XB* = 1 0 0 0 0 0 1

(*XA-XB*)доп.= 0 0 0 0 0 0 1

(*XA-XB*). = 1; *ХС = XA=* 2*.*

а) Оба операнда положительные (*А*>0, *B*>0):

4

2,3) М*А* = . 0 0 0 1 0 0 1 0 1 1 1 0

+

М*В* = . 0 0 0 0 1 1 0 1 0 1 0 0

М*С* = . 0 0 1 0 0 0 0 0 0 0 1 0

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

*С*

0 1  7 8 19

*С*\* = М*С* · 16Р*с* = (0,202)16 · 162 = (20,2)16 = 32.125.

δ*С* = · 100% = . 100% = 0,077%,

б) A> 0 , B>0

МВ->4 = . 0 0 0 0 1 1 0 1 0 1 0 0

М*А* = . 0 0 0 1 0 0 1 0 1 1 1 0

Mc = 1.1 1 1 1 1 0 1 0 0 1 1 0

Mcдп=1.111110100110 , Mc=-(000001011010)

Результат сложения ненормализован.

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

*С*

0 1  7 8 19

сдвигом мантиссы влево и порядок Хс = Хс-1

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

*С*

0 1  7 8 19

*С*\* = М*С* · 16Р*с* = -(0,5А0)16 · 161 = -(5,А)16 = -5.625.

δ*С* = · 100% = . 100% = 0,62%,

с) A> 0 ,B<0

М*А* = . 0 0 0 1 0 0 1 0 1 1 1 0

МВ->4 = .0 0 0 0 1 1 0 1 0 1 0 0

Mc = .0 0 0 0 0 1 0 1 1 0 1 0

Mcдп=1.111110100110 , Mc=-(000001011010)

Результат сложения ненормализован.

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

*С*

0 1  7 8 19

сдвигом мантиссы влево и порядок Хс = Хс-1

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

*С*

*С*\* = М*С* · 16Р*с* = (0,5А0)16 · 161 = (5,А)16 = 5.625.

δ*С* = · 100% = . 100% = 0,62%,

2. Формат *Ф2*

*А* = (12.DEB8) 16 =10010.11011110101110002=0.1001011011110101110002 \*25

*А* = (18,87)10= (12.DEB8) 16 = (0.100101101111010111000)2 · 25

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

19 18 11 10 0  
*В = (13,28)10 = (D.47AE)16* = (0.110101000111101011102)2 · 24

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

1) *XA* = \_1 0 0 0 0 1 0 1

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

(*XA-XB*)доп.= 0 0 0 0 0 0 0 1

(*XA-XB*). = 1; *ХС = ХA* = 5

а) Оба операнда положительные (*А*>0, *B*>0):

1

2,3) М*А* = . 1 0 0 1 0 1 1 1 0 0 0 0

+

М*В* = . 0 1 1 0 1 0 1 0 0 1 0 0

М*С* = 1 . 0 0 0 0 0 0 0 1 0 1 0 0

Результат сложения денормализован влево.

14

4) МС = . 1 0 0 0 0 0 0 0 1 0 1 0

Т.к. выполнен сдвиг мантиссы влево, то характеристику результата нужно увеличить на 1 (*ХС* = *ХС* +1 = 6).

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

*С*

19 18 11 10 0  
*С*\* = М*С* · 2Р*с* = (0,10000000101)2 · 26 = (100000,00101)2 = 32.15625.

δ*С* = · 100% = . 100% = 0,019%,

б) *А*<0, *B*>0

1

М*В* = . 0 1 1 0 1 0 1 0 0 1 0 0

= . 1 0 0 1 0 1 1 1 0 0 0 0

М*С* = 1 . 1 1 0 1 0 0 1 1 0 1 0 0

Mcдп=1.110100110100 -> Mc=-001011001100

Результат сложения денормализован вправа.

24

4) МС =- . 1 0 1 1 0 0 1 1 0 0 0 0

Т.к. выполнен сдвиг мантиссы влево, то характеристику результата нужно увеличить на 1 (*ХС* = *ХС* -2 = 3).

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

*С*

19 18 11 10 0  
*С*\* = М*С* · 2Р*с* =- (0,10110011)2 · 23 = -(101,10011)2 = -5.59375.

δ*С* = · 100% = . 100% = 0,067%,

с) *А*>0, *B*<0

1

М*А* = . 1 0 0 1 0 1 1 1 0 0 0 0



М*В* = . 0 1 1 0 1 0 1 0 0 1 0 0

М*С* = . 0 0 1 0 1 1 0 0 1 1 0 0

Результат сложения денормализован вправа.

24

4) МС = . 1 0 1 1 0 0 1 1 0 0 0 0

Т.к. выполнен сдвиг мантиссы влево, то характеристику результата нужно увеличить на 1 (*ХС* = *ХС* -2 = 3).

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

*С*

19 18 11 10 0  
*С*\* = М*С* · 2Р*с* = (0,10110011)2 · 23 = (101,10011)2 = 5.59375.

δ*С* = · 100% = . 100% = 0,067%,