Волков P3132 В-78

1. Умножение в формате Ф1 по 2 разряда

*A* = 6.6 =( 6.(9))16 ≈ (0.69A)16 \* 161

*XA* = 1 + 64 = 65

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

*B* = 0*.*026 = 0.06A7E*...*16 ≈ 0*.*6A816∗ 16−1

*XB* = -1 + 64 = 63

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

Вычисление знака

*SignC* = *SignA*⊕ *SignB* = 0 ⊕ 0 = 0

Сложение порядков:

XA 1000001

XB 0111111

XA+XB 10000000

d 1000000

XC 1000000

Умножение мантисс:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| № | Опперанды | СЧП (старшие разряды) | В/СЧП (младшие разряды) | Признак коррекции |
| 0 | СЧП | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 0 1 1 0 1 0 1 0 1 0 0 0 | 0 |
| 1 | СЧП → 2 | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 0 0 0 1 1 0 1 0 1 0 1 0 | 0 |
| 2 | 2MA | 0 0 0 1 1 0 1 0 0 1 1 0 1 0 0 | 0 0 0 1 1 0 1 0 1 0 1 0 | 0 |
| CЧП | 0 0 0 1 1 0 1 0 0 1 1 0 1 0 0 |
|  | СЧП → 2 | 0 0 0 0 0 1 1 0 1 0 0 1 1 0 1 | 0 0 0 0 0 1 1 0 1 0 1 0 |  |
| 3 | 2MA | 0 0 0 1 1 0 1 0 0 1 1 0 1 0 0 | 0 0 0 0 0 1 1 0 1 0 1 0 | 0 |
| CЧП | 0 0 1 0 0 0 0 1 0 0 0 0 0 0 1 |
|  | СЧП → 2 | 0 0 0 0 1 0 0 0 0 1 0 0 0 0 0 | 0 1 0 0 0 0 0 1 1 0 1 0 |  |
| 4 | 2MA | 0 0 0 1 1 0 1 0 0 1 1 0 1 0 0 | 0 1 0 0 0 0 0 1 1 0 1 0 | 0 |
| CЧП | 0 0 1 0 0 0 1 0 1 0 1 0 1 0 0 |
|  | СЧП → 2 | 0 0 0 0 1 0 0 0 1 0 1 0 1 0 1 | 0 0 0 1 0 0 0 0 0 1 1 0 |  |
| 5 | 2MA | 0 0 0 1 1 0 1 0 0 1 1 0 1 0 0 | 0 0 0 1 0 0 0 0 0 1 1 0 | 0 |
| CЧП | 0 0 1 0 0 0 1 1 0 0 0 1 0 0 1 |
|  | СЧП → 2 | 0 0 0 0 1 0 0 0 1 1 0 0 0 1 0 | 0 1 0 0 0 1 0 0 0 0 0 1 |  |
| 6 | MA | 0 0 0 0 1 1 0 1 0 0 1 1 0 1 0 | 0 1 0 0 0 1 0 0 0 0 0 1 | 0 |
| CЧП | 0 0 0 1 0 1 0 1 1 1 1 1 1 0 0 |
|  | СЧП → 2 | 0 0 0 0 0 1 0 1 0 1 1 1 1 1 1 | 0 0 0 1 0 0 0 1 0 0 0 0 |  |

Результат:

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

C\*=(0.2BF)16\*160=0.17162

CT = 0.1716

ΔC= CT – C\* = 0.00002

δC=|ΔC/ CT|\*100%=0.0116%

1. Умножение в формате Ф2 по 4 разряда

A = 6.6 = (110.100110011…)2 ≈ (0.110100110011)2 \*23

*XA* = 3 + 128 = 131

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

*B* = 0*.*026 = (0*.*00000110101001111*...)*2 ≈ (0*.*110101001111)2∗ 2−5

*XB* = -5 + 128 = 123

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

Вычисление знака

*SignC* = *SignA*⊕ *SignB* = 0 ⊕ 0 = 0

Сложение порядков:

XA 10000011

XB 01111011

XA+XB 11111110

d 10000000

XC 01111110

Умножение мантисс:

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| № | Операнды | СЧП (старшие разряды) | В/СЧП (младшие разряды) | Признак коррекции |
| 0 | CЧП | 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 0 | 1 1 0 1 0 1 0 0 1 1 1 1 | 0 |
| 1 | [-MA]доп  СЧП | 1 1 1 1 1 0 0 1 0 1 1 0 0 1 1 0 1  1 1 1 1 1 0 0 1 0 1 1 0 0 1 1 0 1 | 1 1 0 1 0 1 0 0 1 1 1 1 | 1 |
|  | СЧП → 4 | 1 1 1 1 1 1 1 1 1 0 0 1 0 1 1 0 0 | 1 1 0 1 1 1 0 1 0 1 0 0 |  |
| 2 | 4MA  MA | 0 0 0 1 1 0 1 0 0 1 1 0 0 1 1 0 0  0 0 0 0 0 1 1 0 1 0 0 1 1 0 0 1 1 | 1 1 0 1 1 1 0 1 0 1 0 0 | 0 |
| СЧП | 0 0 1 0 0 0 0 0 1 0 0 1 0 1 0 1 1 |
|  | СЧП → 4 | 0 0 0 0 0 0 1 0 0 0 0 0 1 0 0 1 0 | 1 0 1 1 1 1 0 1 1 1 0 1 |  |
| 3 | [-4MA]доп  MA | 1 1 1 0 0 1 0 1 1 0 0 1 1 0 1 0 0  0 0 0 0 0 1 1 0 1 0 0 1 1 0 0 1 1 | 1 0 1 1 1 1 0 1 1 1 0 1 | 1 |
| СЧП | 1 1 1 0 1 1 1 0 0 0 1 1 1 1 0 0 1 |
|  | СЧП → 4 | 1 1 1 1 1 1 1 0 1 1 1 0 0 0 1 1 1 | 1 0 0 1 1 0 1 1 1 1 0 1 |  |
| 4 | MA | 0 0 0 0 0 1 1 0 1 0 0 1 1 0 0 1 1 | 1 0 0 1 1 0 1 1 1 1 0 1 |  |
| СЧП | 0 0 0 0 0 1 0 1 0 1 1 1 1 1 0 1 0 |

Результат:

C\*=(0.11111010)2\*2-2=(0.0011111010)2 =0.171508

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

CT = 0.1716

ΔC= CT – C\* = - 0.000092

δC=|ΔC/ CT|\*100%=0.053%

Погрешности результатов вызваны неточным представлением операндов и потерей младших бит СЧП. В формате Ф2 операнды представлены точнее.