Addition and substraction in complementary code

$$[100+40]_{compl} = [100]_{compl} \oplus [40]_{compl}$$

$[100]_{compl} =$ | S | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0 | 1 | 1 | 0 | 0 | 1 | 0 | 0 |

$\oplus$

$[40]_{compl} =$ | S | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 |

S							
1	0	0	0	1	1	0	0

overflow

Subunitary convention

$$x = 13/16 = 13 \cdot 16^{-1} = 0,D_{(16)} = 0,1101_{(2)}$$

$$y = 0,25 = 0,01_{(2)}$$

$0,25 \cdot 2 = (0),5$

$0,5 \cdot 2 = (1),0$

$[x]_{dir} = [x]_{inv} = [x]_{compl} =$ | S_x | | | | | | | |
|---|---|---|---|---|---|---|---|
| 0 | 1 | 1 | 0 | 1 | 0 | 0 | 0 |

$[-x]_{dir} =$ | S_x | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | 1 | 1 | 0 | 1 | 0 | 0 | 0 |

$[-x]_{inv} =$ | S_x | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 1 | 0 | 1 | 1 | 1 |

$[-x]_{compl} =$ | S_x | | | | | | | |
|---|---|---|---|---|---|---|---|
| 1 | 0 | 0 | 1 | 1 | 0 | 0 | 0 |

Examples:

$X = -1035,37$

S.P. , 32 bits , $m > 1$

single precision

$1035 = 1024 + 8 + 2 + 1 = 2^{10} + 2^3 + 2^1 + 2^0 =$

$= 10000001011_{(2)}$

$X = -1035,37 = -10000001011,00111011001100_{(2)}$

$= -(1),00000101110011101100_{(2)} \cdot 2^{10}$

↑ hidden bit

m

S	C = e+2	m
1	10001001	00000101110011101100110
	8 bits	23 bits

C: 4 | 8

m: 1 | 6 | 7 | 6 | 6

$0,37 = 0,16631_{(8)} = 0,\underline{001}\ \underline{110}\ \underline{110}\ \underline{011}\ \underline{001}\ \underline{100}_{(2)}$

$0,37 \cdot 8 = 1,85$

$0,85 \cdot 8 = 6,8$

$0,8 \cdot 8 = 6,4$

$0,4 \cdot 8 = 3,2$

$0,2 \cdot 8 = 1,6$

$C = e+2 = e+127 = 10+127 =$

$= 137 = 2^7 + 2^3 + 2^0 = 128+8+1 =$

$= 10001001$