PSS/SDP LAB 8

(1)

$2^4\ 2^3\ 2^2\ 2^1\ 2^0 \quad 2^{-1}\ 2^{-2}\ 2^{-3}\ 2^{-4}$

1 1 0 1 1 . 0 1 0 1 $= 26.3125$

$16+8+2=26$

$2^{-2}+2^{-4} = \frac{1}{4}+\frac{1}{16} = 0.25+0.0625 = 0.3125$

(2) 273.21875

$273 = 256 + 16 + 1$

$2^8 \quad 2^4 \quad 2^0$

1 0 0 0 1 0 0 0 1

273	2	1
136	2	0
68	2	0
34	2	0
17	2	1
8	2	0
4	2	0
2	2	0
1	0	1
0		

$0.21875 \times 2 = 0.43750$

$0.4375 \times 2 = 0.8750$

$0.875 \times 2 = 1.75$

$0.75 \times 2 = 1.5$

$0.5 = 1.0$

$0.21875 : 0.00111$

$273.21875 : 100010001.00111$

(3) -22

-22.21875

Fixed point 1S6I6F : $\underbrace{\_}_{S}\ \underbrace{\_\_\_\_\_}_{I} . \underbrace{\_\_\_\_\_}_{F}$

0 = +
1 = −

Positive: | SM | C1 | C2

22 : 16 + 4 + 2

$\underbrace{0}_{S}\ \underbrace{010110}_{I}.\underbrace{000000}_{F}$

-22 :

$\underbrace{1}_{S}\ 010110.000000$

$\underbrace{1}_{S}\ \underbrace{101001}_{I}.\underbrace{111111}_{F}$

$\begin{array}{r} 1101001.111111 \\ \qquad\qquad\quad +1 \\ \hline \underbrace{1}_{S}\ \underbrace{101010}_{I}.\underbrace{000000}_{F} \end{array}$

-22.21875 :

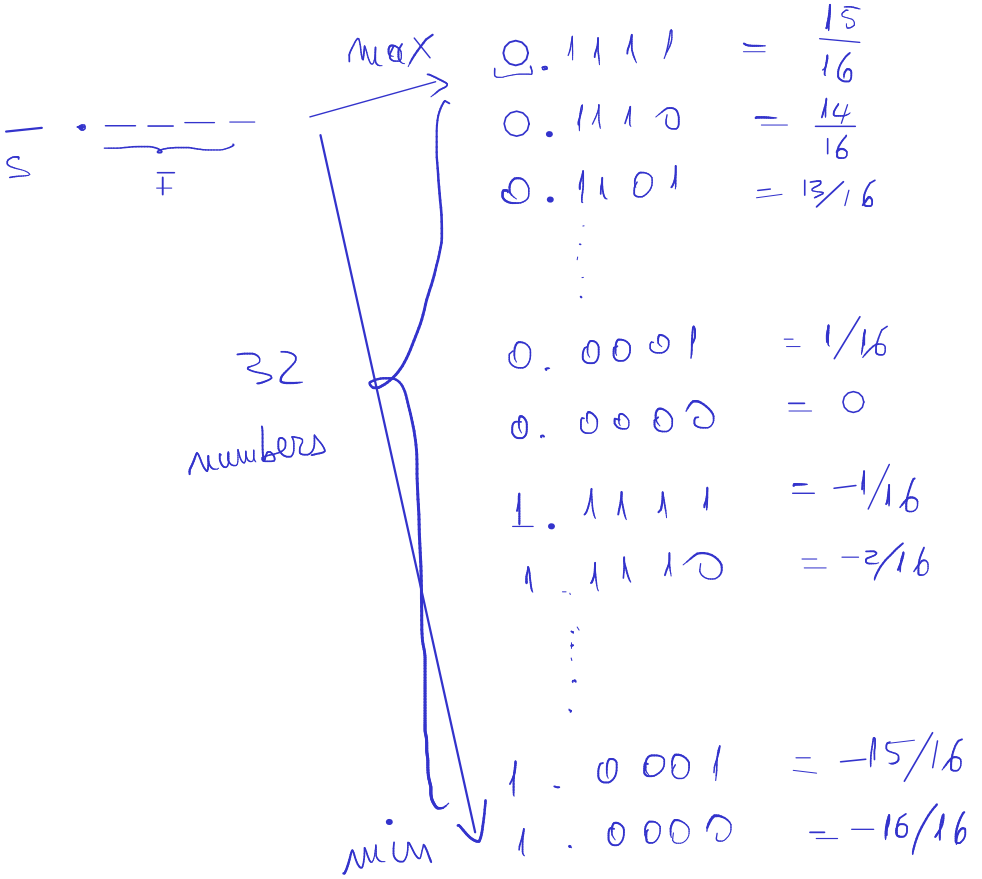
22.21875 : $\underbrace{0}_{S}\ \underbrace{010110}_{I}.\underbrace{001110}_{F}$

-22.21875 : SV: $\underbrace{1}_{S}\ 010110.001110$

C1 : 1101001.110001

C2 : $\begin{array}{r} 1101001.110001 \\ \qquad\qquad\quad +1 \\ \hline \underbrace{1}_{S}\ \underbrace{101001}_{I}.\underbrace{110010}_{F} \end{array}$

(4) Quantize $X_1 = 0.42625$ $X_2 = -0.4333$ on fixed-point 1S0I4F via ← Troncation, Round., Tronc. abs.



1111 = 15
111.1 = 15/2
11.11 = 15/4
.1111 = 15/16

$X_1 = 0.42625 = \frac{0.42625 \times 16}{16} = \frac{6.82}{16}$ → 7/16, 6/16 (R, T.A, T)

$\left[0.42625\right]_T = \frac{6}{16} = 0.375 = \underline{0}.0110$ (S)

$\left[\quad\right]_R = \frac{7}{16} = 0.4375 = 0.0111$

$\left[\quad\right]_{T.A.} = \frac{6}{16} = 0.375 = 0.0110$

$X_2 = -0.4333 = \frac{-6.55}{16}$ → −6/16, −7/16 ⇒

$\left[X_2\right]_T = \frac{-7}{16} = 1.1001$

$\left[X_2\right]_R = \frac{-7}{16} = 1.1001$

$\left[X_2\right]_{T.A.} = \frac{-6}{16} = 1.1010$

6/16 = 0.0110

−6/16 = 1.1001 + 1 = 1.1010 (c2)

7/16 = 0.0111

−7/16 = 1.1000 + 1 = 1.1001