Test of the FFT routine (RFFT_f32u) with 256 points.

Input signal: 128 samples with +24576 and 128 samples with -24576 (simple rectangle pulse). The expected theoretical values for the magnitude would be:

24576*4/(pi*n) for the odd numbers. The even numbers are zero.

Comparison with an existing 256 points fixed point FFT, running on a Renesas RH850 controller. The internal word length of the fixed point calculation is 32Bit.

Theoretical values

n	result
1	31291,13505
2	0
3	10430,37835
4	0
5	6258,22701
6	0
7	4470,16215
8	0
9	3476,792783
10	0
11	2844,648641
12	0
13	2407,010389
14	0
15	2086,07567
16	0
17	1840,655003
18	0
19	1646,901845
20	0
21	1490,05405
22	0
23	1360,484133
24	0
25	1251,645402
26	0
27	1158,930928
28	0
29	1079,004657
30	0
31	1009,391453
32	0
33	948,2162137
34	0
35	894,03243
36	0

Renesas Fixed Point

Expression	Value
[0]	0
[1]	31288
[2]	0
[3]	10430
[4]	0
[5]	6260
[6]	0
[7]	4474
[8]	0
[9]	3481
[10]	0
[11]	2850
[12]	0
[13]	2414
[14]	0
[15]	2095
[16]	0
[17]	1845
[18]	0
[19]	1658
[20]	0
[21]	1502
[22]	0
[23]	1377
[24]	0
[25]	1266
[26]	0
[27]	1172
[28]	0
[29]	1099
[30]	0
[31]	1023
[32]	0
[33]	955
[34]	0
[35]	903
[36]	0

TI floating point

Registers | Expressions

Expression	Type	Value
[0]	float	0.0
[1]	float	31291.9199
[2]	float	0.0
[3]	float	10432.7354
[4]	float	0.0
[5]	float	6262.15674
[6]	float	0.0
[7]	float	4475.66455
[8]	float	0.0
[9]	float	3483.87183
[10]	float	0.0
[11]	float	2853.30713
[12]	float	0.0
[13]	float	2417.25098
[14]	float	0.0
[15]	float	2097.90356
[16]	float	0.0
[17]	float	1854.07507
[18]	float	0.0
[19]	float	1661.91956
[20]	float	0.0
[21]	float	1506.67664
[22]	float	0.0
[23]	float	1378.71777
[24]	float	0.0
[25]	float	1271.49829
[26]	float	0.0
[27]	float	1180.4115
[28]	float	0.0
[29]	float	1102.12231
[30]	float	0.0
[31]	float	1034.15625
[32]	float	0.0
[33]	float	974.638916
[34]	float	0.0

Result: floating point solution yields to a greater error.

Possible reason: the accuracy of the sin and cos values in the twiddle factor table