Author Corrections to "Method of Flow Graph Simplification for the 16-point Discrete Fourier Transform"

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I. Introduction

In the resent published article [1], a new efficient method of realization of the paired algorithm [2], [3] for calculation of the 1-D DFT for real data was demonstrated, by simplifying the signal-flow graph of the transform. It was shown that the calculation of the 16-point DFT for real data requires 12 real multiplications and 58 additions, and 2 multiplications and 20 additions are used for the 8-point DFT. However, the following simple error was made for the complex data.

The statement written in the article "that the paired algorithm is the best by operations of multiplication and addition" is correct. As reported in previous publications (see for instance [4] (page 178, the last column of Table I), or [5] (page 283, Table 5.3)), the numbers of additions for the complex 8-point and 16-point DFTs for complex data by the paired algorithm equal 52 and 144, respectively. As was discussed earlier with Dr. Guoan Bi, the incomplete numbers of additions were placed by mistake in Table I, and extra additions are needed to combine the DFT outputs produced from real and imaginary inputs. Therefore, Table I with the corrected last column should be given as follows (The same estimates were also reported in [6], [7]).

N	$m_{2\|1}$	$a_{2\|1}$	$m_{2\|2}$	$a_{2\|2}$	$m_{2\|3}$	$a_{2\|3}$	$m_{2\|5}$	$a_{2\|5}$	m'_p	α'_p
8	48	72	20	58	8	52	4	52	4	52
16	128	192	68	162	40	148	28	148	24	144

TABLE I

Number of multiplications/additions for calculation of the N-point FFT by algorithms radix-2 by 1,2,3,5 butterflies and paired algorithm.

Thus, the trivial error was made in the article.

We here remind, that as shown in publication [4] (page 178, the last column of Table I), the paired algorithm is the best by operations of additions for any power-two order of the DFT. For example, the split-radix algorithm for the 1024- and 2048-point complex DFTs requires respectively 27652 and 61444 real additions [6], and the paired algorithm uses 19188 and 40644 real additions, respectively.

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In addition, another "typo error" is in the matrix given in Section III, page 386 [1]. In the second row, 0 2 4 6 0 2 4 8 should be 0 2 4 6 0 2 4 6, and this matrix shown below in the corrected form:

$$||t = (np) \bmod 8||_{\substack{n=0:7 \\ p=1,2,4,0}} = \begin{Vmatrix} 0 & 1 & 2 & 3 & 4 & 5 & 6 & 7 \\ 0 & 2 & 4 & 6 & 0 & 2 & 4 & 6 \\ 0 & 4 & 0 & 4 & 0 & 4 & 0 & 4 \\ 0 & 0 & 0 & 0 & 0 & 0 & 0 & 0 \end{Vmatrix}$$

II. Acknowledgment

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