

# **Computing for Human Services**

**Chief Editor**

**Shihab Ahmed Hameed**

*Electrical and Computer Engineering-IIUM University*

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## Chapter 7

### Computer Implementable Quick Fourier Transform (QFT) for Engineering Educators

Abdulfattah A. Aboaba<sup>S#</sup>, Shihab A. Hamced<sup>S</sup>, Othman O. Khalifa<sup>S</sup>, Aisha H. Abdalla<sup>S</sup>, Ado Dan-Isa<sup>\*</sup>, Jubril D. Jiya<sup>&</sup>, James Katende<sup>o</sup>, Abdulfattah B. Mustapha<sup>@</sup>, & Abdullahi L. Amoo<sup>&</sup>

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#### 7.1. Introduction

The purpose of education is to transmit knowledge and teachers are to ensure students understands the fundamentals of knowledge in order to apply it to solving our recurrent challenges. The advent of computer system had definitely expand the frontiers of knowledge but unwarely it has in some cases hindered students' understanding of the rudiments of knowledge. Ironically, like 'Back-EMF' one of such areas negatively affected by computer system or computerized sulotion is Mathematics – which created computer software and by extention computer hardware. Today, students can produce solutions to complex mathmatical problems within a short time curtesy computer systems or embedded systems but without knowing how to manually solve the problem or explain the method and how and why the machine solved it in that way. Such student soon becomes totally dependent on the machine, and may not be able to improve on the method or device a new method for solving problems.

#### 7.2. Fundemantal to Fast Fourier Transform

The smart fourier transform method was bone out of the author's desire to understand how the Discrete Fourier Transform could be implemented by the computer using a self-written program code, and not just relying on the evocation of fft on the computer. This normally require the understanding of DFT and FFT algorithms which was consequent to the heuristic but novel discovery of the systematic relationships in DFT solutions. Fast Fourier Transform (FFT) is an algorithm for efficient computation of Discrete Fourier Transform (DFT) [1][2]. With the introduction of FFT in 1965 by Cooley and Tukey, it lead to the simplification of many