Abstract

Discrete Cosine transform (DCT), Inverse DCT, Discrete Fourier Transform (DFT) and Fast Fourier Transform (FFT) are performed by DSP system on one platform. This paper represents the design of a Digital Signal Processor (DSP) system described using VHDL and implemented in a Field Programmable Logic Array (FPGA). The Fast Fourier Transform (FFT) is one of the rudimentary operations in the field of digital signal and image processing. Some of the very vital applications of the fast Fourier transform include Signal analysis, Sound filtering, Data compression, Partial differential equations, Multiplication of large integers, Image filtering etc. Fast Fourier transform (FFT) is an efficient implementation of the Discrete Fourier Transform (DFT). This paper concentrates on the development of the Fast Fourier Transform (FFT), based on Decimation-In-Time (DIT) domain, Radix-2 algorithm, this paper uses VHDL as a design entity, and their Synthesis by Xilinx Synthesis Tool. The input of Fast Fourier transform has been given by testbench and output has been displayed using the waveforms on the Xilinx Design Suite 13.1. The synthesis results show that the computations for calculating the Fast Fourier transform. By using a fixed geometry addressing, pipeline designing and block fixed point structure, the data has the greater precision and dynamic range. The results show that the design is efficient, strongly extensive and occupies less resource. It is a good method to meet the high-speed digital signal processing requirements.
References


Index Terms

Computer Science  Signal Processing
**Keywords**

Control Unit (CU)  General Purpose Register (GPR)  Register Set (RS)  Multiply and accumulates (MACs)

Very Large Instruction Word (VLIW)