DIGITAL SIGNAL PROCESSING OVER ANALOG SIGNAL PROCESSING

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Abstract: -

This paper provides a survey of digital signal processing over analog signal processing. Initially digital signal processing is developed to replace limited application based analog signal processing (ASP) of high cost. This paper describes the comparison of analog signal processing (ASP) and digital signal processing, technology under digital signal processing, application of digital signal processing, new technology of digital signal processing (DSP). This paper also focuses on the future scope of digital signal processing (DSP).

Keywords: DSP, ASP, Compression, signal, technology

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I. INTRODUCTION

Digital signal is the mathematical manipulation of an information signal to modify or improve it in same way main aim of DSP is usually to measure filter and or continuous real world analog signal digital signal processing involve linear or non-linear operation analog signal is a continuous signal an analog signal uses some property of the medium to convey the signal information an analog signal has a theoretically infinite resolution the term analog signal usually refers to electrical signal. Analog system is a collection and interconnection of several building block is that performs some operation on an analog input signal to produce an analog output signal.

II. COMPARISON OF DSP OVER ASP

S.No.	PARAMETERS	DSP	ASP
1.	FLEXIBILITY	More. They act as both high pass filter as well as low pass filter by changing software program.	Less. They act as only high pass filter.
2.	ACCURACY	More. Because of resolution of analog to digital converters.	Less. Because of component tolerance and breakdown problems.
3.	STORAGE	Easily storage by the use of magnetic tapes and disks.	Difficulty in storage due to noise and distortion.
4.	COST	Not expensive due to complexity in applications.	Expansive
5.	MATHEMATICAL PROCESSING	High and accurate.	Low because of algorithm based technology.
6.	SIZE AND RELIABILITY	Small in size and more reliability	Large in size and have less reliability.
7.	TEMPERATURE DEPENDENCY	Independent of temperature	Depend on temperature.
8.	ADAPTABILITY	Easy upgradable	Not possible.

Table 1 Comparison between ASP and DSP

III. TECHNOLOGY USED FOR DSP

Two types of technology are used for digital signal processing are as following:

A. DEDICATED PROCESSOR BASED DSP

These system uses digital signal processor. There are three types of chip series are used that is ADSP-21XX series , TMS-320XXX series , M- 56XXX series but TMS-320XXX series is most commonly used . These types of processor are specially designed for array operations and multiply accumulate operations. These types of systems have low cost and applicable for real time processing.

B. GENERAL PURPOSE BASED DSP

These types of systems uses general purpose computers or microprocessor .

Example: Z transform , DFT , FFT , C software

These types of operations can be done on a computer.

IV. NEW TECHNOLOGY OF DSP

In new technologies , signals are of large bandwidth can be digitally processed and complex digital signal processing algorithms can be implemented using these new technologies . and new high speed digital signal processing techniques that are applicable in satellite communication . new digital signal processing arise for future satellite payloads such as beamforming station can be implemented thereby improving ground terminal performance. Advanced digital signal processing uses mobile communication terminals such as multipath cancellation fading counter measure multiple access interference suppression . significantly it provides higher resource efficiency , improving power and resource usage .

V. APPLICATIONS OF DSP

A, IMAGE PROCESSING

It includes

1. pattern recognition
2. animation
3. robotic vision

4. image enhancement

B. INSTRUMENTATION AND CONTROL It includes

1. Spectral Analysis
2. Noise Reduction
3. Data Compression

C. SPEECH

It includes

1. Speech Recognition
2. Speech Synthesis
3. Equalisation

D. BIOMEDICAL It includes

1. Scanners
2. ECG Analysis
3. Patient Monitoring

E. TELECOMMUNICATION It includes

1. Echo Cancellation
2. Spread Spectrum
3. Data Communication

F. MILITARY It includes

1. Sonar Processing
2. Radar Processing
3. Secure Communication

G. CONSUMER APPLICATION It includes

1. digital audio and video
2. television and music systems

H. INDUSTRIAL APPLICATION It includes

1. Robotics and CNC
2. Power line monitors

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