Wall Filter for Color Flow

Medical Imaging DSP Applications Team

1 Description

The module filters the echoes reflected from tissue and vessel walls, so that velocity is estimated only from the moving red blood cells. This module implements the infinite impulse response (IIR) filtering operation. Since the wall filter module needs to operate with finite number of samples, the transient response of the filter becomes very important. Hence, a state space formulation of the IIR filter is used. This module supports zero, step and projection initialization schemes.

Project collateral discussed in this document can be downloaded from the following URL: http://www-s.ti.com/sc/techlit/sprs642.zip.

2 Kernel Complexity (C64x+™ CPU cycles, based on CPU cycle accurate Simulator)

0.49865*D*N*N +4.6849*D*N -20.4024*N + 275.1664

where

D = Number of samples per scan-line
N = Number of ensembles

3 Cycles on TMS320C6455 EVM

The performance is given for several example cases on the C6455 EVM in cycles. The test bench for Color Flow (1D) can be used to find cycles of interest for any other valid configuration.

D	N	Test Case	EVM Cycles per Scan-Line
200	10	8	19764
256	32	9	172816
256	16	18	52688

4 Memory

The following table shows the memory consumption of the dpuWallfilterColor module.

Memory	Size in Bytes
Program	928

5 Reference

1. Bjaxum, S., Torp, H. and Kristoffersen, K., “Clutter Filter Design for Ultrasound Color Flow Imaging”, *IEEE Transactions on Ultrasonics, Ferroelectrics, and Frequency Control*, Vol. 49, No. 2, pp. 204-216, Feb. 2002.

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