

A SYSTEM AND METHOD FOR OPTIMIZING SIGNAL  
PROCESSING VIA A UNIQUE TRUNCATING AND ROUNDING  
OPERATION  
ABSTRACT

A system and a method for optimizing operation of a device employing a signal processing function involving accumulation, a preferred embodiment of which is a digital finite impulse response (FIR) filter (100). The system and method significantly reduces silicon area needed on a chip by reducing the number of gates needed. The maximum number of bits needed for adequate processing is pre-calculated as is the number of bits needed to describe the output signal. The number of bits needed at the output is reduced by the number representing the modulo B, as determined by the system architect. Commonly used values for B are 5 and 6. By removing one MSB bit within the internal representation at each stage and truncating a two least significant bits (LSBs) and rounding the third LSB at each stage of an 8-tap FIR filter 100, for example, a significant reduction in hardware is achieved while incurring an error of less than a fraction of an output LSB.

FIGURE 1