Elliptic IIR filter sharpening implemented on FPGA

V. Poučki, A. Žemva, M. Lutovac, T. Karčnik

References:
DIGITAL SIGNAL PROCESSING, Vol. 20, No. 1, pp. 13-22, Jan, 2010

Abstract:
Filter sharpening is a technique for designing a higher order filter using several identical low-order filters with the same passband and stopband edge frequencies but with smaller passband ripple and larger stopband attenuation. The technique had been applied to linear phase finite impulse response (FIR) filters only. In this paper the method is applied on the elliptic infinite impulse response (IIR) filters that have nonlinear phase response. By increasing the order of the basic elliptic filter, the transition region can be significantly reduced. The straightforward design procedure is presented. Filters are implemented using the field programmable gate array (FPGA) chips and hardware folding technique.

Keywords:
Filter sharpening, Hardware folding, Elliptic IIR filters, Infinite impulse response IIR filters, Field programmable gate array – FPGA chips, Time-multiplexing