A new criterion for the design of variable fractional-delay FIR digital filters

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Abstract

Conventionally, variable fractional-delay finite-impulse-response digital filters are generally designed by minimizing the root-mean-square error of variable frequency response. In this paper, a new criterion concerning the minimization of the root-mean-square error of variable group-delay response is proposed. However, minimization is a highly nonlinear problem, so an iterative method is proposed in this paper to overcome it. To further reduce the maximum absolute group-delay error in the least squares design, an iterative weighting-updated technique is also proposed, which constitutes the outer loop of the overall iterative process while the iteration stated earlier makes up the inner loop. Several design examples will be presented to demonstrate the effectiveness of the proposed method. © 2006 IEEE.

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