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Design of fixed point state space digital filters with low round-off noise. (English)

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Summary: A simple method is described for the design of fixed-point recursive digital filters with low round-off noise. The method is based on reducing to zero as many as possible of the coefficients of the filter state matrices. An optimization procedure is used to get the optimum value of linear transformation that minimizes the total output round-off noise power. Compared with the existing approaches, this method is characterized by its computational simplicity, very low output round-off noise (if not the lowest possible) and low coefficient sensitivity. The structure of the proposed technique is modular, which makes it suitable for VLSI implementation. The technique is then employed to obtain a reduced-order low-round-off-noise filter with characteristics equivalent to some desired FIR specifications. Illustrative examples are given to verify these advantages.

MSC:

94C05 Analytic circuit theory

Cited in 1 Review

Keywords:

design of fixed-point recursive digital filters; low round-off noise; low coefficient sensitivity; VLSI implementation

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