

Title (en)
A fast multiplierless transformation

Title (de)
Schnelle Transformation ohne Multiplizierer

Title (fr)
Transformation rapide sans multiplicateur

Publication
EP 1311975 A1 20030521 (EN)

Application
EP 00916411 A 20000317

Priority
• US 0006941 W 20000317
• US 12474699 P 19990317

Abstract (en)
[origin: WO0055757A1] A preferred embodiment of the invention provides an $M \times M$ multiplierless perfect reconstruction block transform (i.e., perfect reconstruction is realized if the invention is utilized for both analysis and synthesis, otherwise, if the invention is used on only one end, near-perfect reconstruction results) with symmetric/antisymmetric basis functions, i.e., linear phase filter. In a preferred embodiment, a cascade of ± 1 butterfly stages (12) is provided followed by two invertible matrices. Each invertible matrix is made up of a cascade of lifting steps (16) and scaling factors (α_i). The scaling factors can be folded into the quantization stepsizes. A forward binDCT (e.g., for signal analysis), can be implemented using a cascade of ± 1 butterflies (12) and dyadic lifting steps (16). Furthermore, an inverse binDCT (e.g., for signal synthesis) can be easily realized using lifting steps (16) of reverse order and inverted polarity, cascaded with ± 1 butterflies (12). In accordance with an embodiment of the invention, all of the lifting coefficients have been chosen to be dyadic rational numbers. Each dyadic lifting step can be constructed by a simple combination of shift-and-add operations.

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Cited by
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