



DESIGN AND AUTOMATIC CODE GENERATION OF A TWO-DIMENSIONAL FAST COSINE TRANSFORM FOR SIMD DSP ARCHITECTURES (MonPmPO4)

★ Author(s) :

Arne Lehman
Pablo Robelly
Gerhard Fettweis

(Technische Universitaet Dresden, Germany)

(Technische Universitaet Dresden, Germany)

(Technische Universitaet Dresden, Germany)

★ Abstract :

Fast Algorithms for the computation of the two-dimensional Discrete Fourier Transform (DCT) can be described by means of elements of Multilinear Algebra. Multilinear Algebra offers not only a formalism for describing the algorithm, but it enables the derivation by pure algebraic manipulations of an algorithm that is well suited to be implemented in vector-SIMD signal processors with different levels of parallelism. The vector formulation of the two-dimensional DCT (2D-VDCT) can be implemented in a matrix oriented language and a suitable compiler generates code for the vector architecture. We show in this paper how important speedup factors can be achieved with this methodology.