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

Author(s) :
Arne Lehman (Technische Universitaet Dresden, Germany)
Pablo Robelly (Technische Universitaet Dresden, Germany)
Gerhard Fettweis (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.