Abstract A new unified matrix processor for the main DSP discrete procedures: convolution, correlation functions and filtering of signals based on discrete cosine transform (DCT-II), is proposed and described. It is shown that these procedures can be computed using the same building blocks which give the processor universal computational structure property. The computational complexity analysis of the proposed processor shows that the FCT-based matrix processor for N-point convolution and correlation computing allows a reduction by 2N - 3 real multiplications and N - 2 real additions in comparison with other processors of the same class. The architecture of the processor supports the classic schema for computing DSP procedures: (Two DCT spectrums + product of cosine spectrums + IDCT transform). The proposed architectures employ simple Processor Elements (PE) that require real multiplications and additions.

Keywords – Matrix Processor, Discrete Cosine Transform (DCT), Convolution, Filtering and Correlation of Signals, DCTdomain filtering, FCT Processor.