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A new word-parallel CORDIC processor for ultrasonic imaging applications

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ABSTRACT

The CORDIC algorithm is an iterative method for the efficient computation of vector rotations and several other trigonometric and hyperbolic functions. We have developed a fast, redundant, constant-scale factor, word-parallel implementation of a CORDIC algorithm to rotate ultrasonic signal vectors. The implementation is an improvement of a similar 1996 algorithm known as the differential CORDIC. The CORDIC processor is a part of an ultrasonic imaging system under development and has been implemented using logic synthesis of VHDL descriptions on a Xilinx Virtex 800 FPGA. The results of simulation and testing of the CORDIC rotator using a novel VHDL testbench have been presented. The error resulting from truncations is well within the expected limit.