**Design and high-performance hardware architecture for image coding using block-lifting-based quaternionic paraunitary filter banks**

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**Abstract.** In this paper, we have introduced a generalized block-lifting structure using the 2-D CORDIC algorithm as a block of 4-band linear phase paraunitary filter banks (LP PUFB) based on the quaternionic algebra (Q-PUFB) for the lossy-to-lossless image coding. A bank Q-PUFB based on the 2-D CORDIC block-lifting structure reduces the number of rounding operations and has a regular layout. Since the block-lifting structures with rounding operations can implement the integer-to-integer transform (Q-PUFB). The parallel-pipelined efficient architecture (P2E\_Q-PUFB) has been proposed. The low latency separable image processing is implemented in the given architecture.

**Keywords:**

IEEE Keywords:

Handheld computers, Embedded computing, Decision support systems, Filter banks, Image coding, Computational efficiency, Transforms.

INSPEC: Controlled Indexing.

image coding, algebra, channel bank filters, digital arithmetic.

INSPEC: Non-Controlled Indexing.

lossy-to-lossless image coding, high-performance hardware architecture, quaternionic paraunitary filter banks, generalized block-lifting structure, 2D CORDIC algorithm, 4-band linear phase paraunitary filter banks, LP PUFB, quaternionic algebra, Q-PUFB.

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