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Christopher M. Brislawn* (brislawn@lanl.gov), Los Alamos National Laboratory,
Information Sciences Group (CCS-3), Mail Stop B265, Los Alamos, NM 87545-1663. *Groups of
Linear Phase Filter Banks.*

FIR filter banks are the digital incarnations of compactly supported wavelet transforms. Linear phase filter banks correspond to symmetric or antisymmetric wavelets and are particularly important in applications like digital signal and image coding. Filter banks are represented mathematically by invertible *polyphase transfer matrices* over (Laurent) polynomial rings. *Lifting factorization* is a method for factoring such transfer matrices into elementary matrix decompositions such that each factor matrix has a single off-diagonal lifting filter. Transfer matrix factorizations are useful for both theoretical and practical engineering purposes, and the theory of factoring linear phase transfer matrices into linear phase lifting factors has a particularly rich algebraic structure because of the various symmetries involved. The polyphase matrices for odd-length linear phase filter banks form a nonabelian matrix polynomial group known as the *whole-sample symmetric (WS) group*. Results of the author on uniqueness of linear phase lifting factorizations for WS filter banks are used to characterize the group-theoretic structure of the WS group up to isomorphism. Analogous results are also obtained for even-length (*half-sample symmetric*) filter banks. (Received February 10, 2014)