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Cohomology Developed Matrices - constructing weighing matrices from their automorphisms

Given an $m \times n$ matrix W with values in $\mu_n^+ = \{exp(2ik\pi/n)|0 \leq k \leq n-1\} \cup \{0\}$, we study its Hadamard Automorphism group. Our concern is as how to recover W from its absolute $|W|$ such that automorphisms of $|W|$ lift to those of W. The solution to this problem is governed by some spectral sequence. By applying algebraic methods we are able to construct new families of Hadamard and Weighing matrices. Our method generalizes the theory of cocyclic nmatrices.