Algorithms and open problems for weighing matrices

Ilias S. Kotsireas[1]

[1] *Wilfrid Laurier University, Waterloo, Canada, ikotsire@wlu.ca*

Weighing matrices are generalizations of Hadamard matrices, that arise in constructive and algorithmic combinatorics and have applications in Coding Theory, Cryptography, Quantum Computing and other areas. The concepts of periodic and aperiodic autocorrelation can be used to provide a succinct and unified description of several different classes of combinatorial matrices [1], including weighing matrices of special structure. We will survey some algorithms to construct such weighing matrices, with emphasis on their computer algebra, data analytics, big data and parallel computing aspects. We will also mention some conjectures and open problems.

References

[1] I. Kotsireas. Algorithms and Meta-heuristics for Combinatorial Matrices. Handbook of Combinatorial Optimization, 2nd Edition, 2013, Panos Pardalos, Ding-Zhu Du, Ronald Graham (Editors) pp 283–309.