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Asymptotic optimality of the Westfall--Young permutation procedure for multiple testing under dependence

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Test statistics are often strongly dependent in large-scale multiple testing applications. Most corrections for multiplicity are unduly conservative for correlated test statistics, resulting in a loss of power to detect true positives. We show that the Westfall--Young permutation method has asymptotically optimal power for a broad class of testing problems with a block-dependence and sparsity structure among the tests, when the number of tests tends to infinity.

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