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

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(Submitted on 10 Jun 2011 (v1), last revised 19 Mar 2012 (this version, v2))

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.

Comments:	Published in at this http URL the Annals of Statistics (this http URL) by the Institute of Mathematical Statistics (this http URL)
Subjects:	Statistics Theory (math.ST)
Journal reference:	Annals of Statistics 2011, Vol. 39, No. 6, 3369-3391
DOI:	10.1214/11-AOS946
Report number:	IMS-AOS-AOS946
Cite as:	arXiv:1106.2068v2 [math.ST]

Submission history

From: Nicolai Meinshausen [view email] [v1] Fri, 10 Jun 2011 14:18:25 GMT (19kb) [v2] Mon, 19 Mar 2012 06:20:26 GMT (105kb)

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