

**SUPERMODULAR ORDERING OF POISSON AND BINOMIAL RANDOM  
VECTORS BY TREE-BASED CORRELATIONS**

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*Abstract:* We construct a dependence structure for binomial, Poisson and Gaussian random vectors, based on partially ordered binary trees and sums of independent random variables. Using this construction, we characterize the supermodular ordering of such random vectors via the componentwise ordering of their covariance matrices. For this, we apply Möbius inversion techniques on partially ordered trees, which allow us to connect the Lévy measures of Poisson random vectors on the discrete  $d$ -dimensional hypercube to their covariance matrices.

**2010 AMS Mathematics Subject Classification:** Primary: 60E15; Secondary: 62H20, 05C05, 06A11, 60E07.

**Keywords and phrases:** Stochastic ordering, supermodular functions, Möbius transform, Möbius inversion, binary trees, Poisson random vectors, binomial random vectors.

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