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Title : On the union of orthants in the n -space

Abstract: Our sets are orthants in R^n and N , the number of them is large ($N > n$). Based on functional representation we present related duality theorems and some useful ideas in connection with geometry. Using recursive projections onto lower dimensional spaces we find a suitable partial order relation, which enables us to efficiently calculate the probability or expectation of union of such sets. Its worst case time complexity is $O(n^2 N^2 + n N \log N)$ for the union of N orthants in R^n .