The Expectations of Maxima and Optimal Selection in Assemblies of Independent Random Variables

by
DV Tokarev and BA Borovkov
Department of Mathematics and Statistics, The University of Melbourne, Australia
Victoria 3010, Australia
dtokarev@unimelb.edu.au

Abstract

Let $X^1, \ldots, X^k$ and $Y^1, \ldots, Y^m$ be identically distributed copies of non-negative random variables X and Y respectively, all mutually independent. For a fixed total number of copies n, we examine the behaviour of $M(k, n-k) := E \max\{X^1, \ldots, X^k, Y^1, \ldots, Y^{n-k}\}$, specifically to find $k = k(n)$ for which $M(k, n-k)$ is maximal, classifying the types of behaviour that may occur and providing sufficient conditions for them as well as a strategy for such optimal selection. Generalisations to an arbitrary number of distributions are indicated as well as applications to simple branching processes and a discussion of relevance to reliability and questions of diversity such as the Single Large or Several Small debate.

This was joint work with ???.