

Standard Stochastic Orders and Joint Stochastic Orders: Mutual Relationships Based on Copulas

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Abstract

In order to take into account any possible dependence between alternatives in optimization problems, bivariate characterizations of some well-know univariate stochastic orders have been defined and studied by Shanthikumar and Yao in 1991. For the same reasons, more alternative definitions of orders, useful to compare non independent lifetimes, have been proposed in recent literature. All these characterizations of the main standard univariate stochastic orders gave rise to new stochastic comparisons, commonly called joint stochastic orders, which are equivalent to the original ones under assumption of independence, but are different whenever the variables to be compared are dependent. In this talk we describe sufficient conditions on the survival copula describing the dependence among the compared variables such that the standard stochastic orders imply the corresponding joint stochastic orders, and viceversa. An example of application to a real data set will be also described during the talk.

Key words: usual stochastic order, likelihood ratio order, hazard rate order, joint stochastic orders, copulas.

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