Linear combinations of random variables and their applications

Peng Zhao (zhaop07@gmail.com, Jiangsu Normal University)

Linear combinations of random variables have attracted considerable attention due to their typical applications in nonparametric goodness-of-fit tests, economics, game theory, engineering, insurance, information science, reliability, etc. Let $X_1, \ldots, X_n$ be independent random variables on $\Re_+$. We are interested in the linear combination, $\sum_{i=1}^{n} a_i X_i$, $a_i \in \Re_+$. Especially, the cases when X_i is exponential or gamma distribution are extremely important since they have many interesting applications in various areas. For example, in reliability theory, it naturally arises in the study of redundant standby systems; in queuing theory, it is used to model the total service time of an agent in a system; in insurance, it is used to model total claims on a number of policies in the individual risk model. In this talk, we focus on stochastic properties of linear combinations of heterogeneous random variables. We also discuss several nice applications in the diverse fields, especially in game theory.