Abstract:
A parametric family of n-dimensional copulas is introduced. Members of this family arise naturally as survival copulas in frailty models. The presented probabilistic construction principle introduces dependence to initially independent exponential random variables by means of first-passage times of a Levy subordinator. Jumps of the Levy subordinator are reflected in a singular component of the copula. A result of Gnedin (2008) is applied to show that a tractable subclass is parametrized by completely monotone sequences. Additionally, a characterization of completely monotone sequences via copulas is derived. An alternative characterization is given in Hausdorff (1921) in terms of random variables with compact support. The resulting correspondence between random variables, Levy subordinators, and copulas is studied and illustrated by several examples. Finally, it is used to provide a general methodology for sampling the copula in many cases. The new class is shown to share some properties with Archimedean copulas regarding construction and analytical form.