Mathematics > Probability

Consistent single- and multi-step sampling of multivariate arrival times: A characterization of self-chaining copulas

Damiano Brigo, Kyriakos Chourdakis

(Submitted on 10 Apr 2012 (v1), last revised 28 Apr 2012 (this version, v3))

This paper deals with dependence across marginally exponentially distributed arrival times, such as default times in financial modeling or inter-failure times in reliability theory. We explore the relationship between dependence and the possibility to sample final multivariate survival in a long time-interval as a sequence of iterations of local multivariate survivals along a partition of the total time interval. We find that this is possible under a form of multivariate lack of memory that is linked to a property of the survival times copula. This property defines a "self-chaining-copula", and we show that this coincides with the extreme value copulas characterization. The self-chaining condition is satisfied by the Gumbel-Hougaard copula, a full characterization of self chaining copulas in the Archimedean family, and by the Marshall-Olkin copula. The result has important practical implications for consistent single-step and multi-step simulation of multivariate arrival times in a way that does not destroy dependency through iterations, as happens when inconsistently iterating a Gaussian copula.

Subjects:	**Probability (math.PR)**; Statistics Theory (math.ST); Pricing of Securities (q-fin.PR)
MSC classes:	60E07, 62H05, 62H20, 62H99
Cite as:	**arXiv:1204.2090 [math.PR]**
	(or **arXiv:1204.2090v3 [math.PR]** for this version)

Submission history

From: Damiano Brigo [view email]
[v1] Tue, 10 Apr 2012 09:39:25 GMT (19kb)
[v2] Fri, 13 Apr 2012 19:33:59 GMT (20kb)
[v3] Sat, 28 Apr 2012 17:01:58 GMT (21kb)

Which authors of this paper are endorsers?