

Ageing properties of some bivariate distributions from the Farlie-Gumbel-Morgenstern family[†]

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SUMMARY

In many practical problems, bivariate lifetime data frequently arise, it is of great interest to consider different bivariate distributions and their ageing properties are also useful, as it is often important to make explicit assumptions on the underlying distribution. The lifetime of one system is determined by its components and structure. For instance, in reliability and biological systems the components or organ lifetimes are often positively dependent in some stochastic sense. The most of the systems formed in the real life are the series and parallel systems, which are determined by the working of all or at least one of these components, respectively. Thus, the ageing properties of its series and parallel systems formed with components having such bivariate distributions also become of interest in such applications.

In the literature, different procedures have been used to generate bivariate distributions (cf. [1], among others). For example, some distributions of Marshall-Olkin type have been recently analyzed (cf. [2], [3]). Another well-known procedure is the Farlie-Gumbel-Morgenstern system, having a simple natural dependent structure with given marginals. In this work, we study some ageing properties of specific bivariate distributions belonging to the Farlie-Gumbel-Morgenstern class of distributions.

Keywords: Ageing, series and parallel systems, Farlie-Gumbel-Morgenstern family

AMS Classification: 62H10, 62N05, 91B02

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