Conditions for mixture representation of system lifetime distribution

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Abstract

Under the assumption that the component lifetimes of a reliability system are independent and identically continuously distributed, Samaniego [4] represented the system lifetime distribution as a mixture of distributions of order statistics of component lifetimes with the vector of mixture representation, called the Samaniego signature, depending merely on the system structure. Navarro *et al* [3] extended the Samaniego formula to the case of exchangeable component lifetimes. Marichal *et al* [1] presented necessary and sufficient conditions assuring the Samaniego representation which were expressed in terms of distributional properties of families of auxiliary indicator random vectors parametrized by positive numbers. In [2] we obtained other necessary and sufficient conditions with a more natural probabilistic interpretation. They are represented in terms of the marginal distributions of component lifetimes and the dependence copula of them.

Keywords

Coherent system, Samaniego signature, Exchangeable distribution, Diagonally dependent copula.

References

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