THE HAZARD RATE PROPERTIES OF PARALLEL AND SERIES SYSTEMS FOR BIVARIATE EXPONENTIAL DISTRIBUTIONS

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Abstract

In this paper, two-component systems (parallel and series) with stochastically dependent components are considered. The aim is to investigate an ordering relation according to their hazard rates among the lifetime of the system with dependent and independent components, and the lifetime of the component. In addition, monotonicity of the hazard rate of two-component system for a bivariate exponential family of distributions is examined. Moreover, some general properties of the hazard rates of the systems for the Clayton’s Distribution Family are given.

Keywords: Hazard rate, Hazard rate ordering, Systems with dependent components.


1. Introduction

Consider a system consisting of several components. Suppose there is a system whose components are working under the same environment, or subjected to the same set of stresses and sharing the load. Generally, the lifetimes of the components are dependent. For example, consider a squad with two dealers in a sales department. If the success of the team depends on the marked sales for both dealers then the success of one may encourage the success of the other. Therefore, the amount of the individual sales of each dealer will be affected by the other. For a multicomponent system, it is desired to discuss the monotonicity of the hazard rates of such systems at least in two-component systems. That is, we are going to investigate whether the system lifetime behaves like its components or not when the component lifetimes have an increasing (or decreasing) hazard rate.

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