On Allocation of Redundant Components in Series and Parallel Systems with Dependent Components

Felix Belzunce and Jose M. Ruiz
Dpto. de Estadistica e IO
Universidad de Murcia
30100 Espinardo (Murcia)
Spain
belzunce@um.es, jmruizgo@um.es

Helena Martinez-Puertas
Dpto. de Estadistica y Matematica Aplicada
Universidad de Almeria
04120 Almeria
Spain
hmartinez@ual.es

Abstract

The problem of where to allocate a redundant component in order to increase the reliability of a system is one of the important problems in reliability. Two types of redundancy, active and standby, are the most common types of redundancy. An active redundant is put in parallel with a component at the same time and a standby redundant component is put to use upon the failure of the original component.

This problem has been studied along the 90's, as can be seen in Boland, El-Neweihi and Proschan (1992), El-Newihi and Sethuraman (1993), Singh and Misra (1994), Boland and Proschan (1994), Meng (1996), Xie and Lai (1996), Singh and Singh (1997), Mi (1999), and more recently in Valdes and Zequeira (2003), Romera, Valdes and Zequeira (2004) and Valdes and Zequeira (2006). All these papers consider the case where the components are independent. In the case of dependent components not two much work have been done and the reader can look at section 10.3 in Lai and Xie (2006) for some partial results in this direction. The purpose of this work is to study the problem of allocation of redundant components for series and parallel made of dependent components.