

Semi-Markov Reliability Model of the Renewal Cold Standby System

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The Semi-Markov reliability model of the renewal cold standby system is presented in the paper. The model is some modification and generalization of the model that was considered by Barlow & Proshan [1], Brodi & Pogosian [2]. We assume that the system consists of one operating series subsystem, an identical stand-by subsystem and a switch. When the operating subsystem fails, the spare is put in motion by the switch immediately. The failed subsystem is renewed. There is a single repair facility. A renewal time is a random variable having distribution depending of a failed component. To describe the reliability evolution of the system, we construct a stochastic Semi-Markov process by defining the states and the renewal kernel of that one. The time to failure of the system in our model is represented by the random variable that denotes the first passage time from the given state to the subset of states. Appropriate theorems from the Semi-Markov processes theory allow us to calculate the reliability function and mean time to failure. Because calculating an exact reliability function of the system by using Laplace transform is a complicated matter we apply theorem deal with perturbed Semi-Markov processes [3], [4] to obtain an approximate reliability function of the system.

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