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Abstract of the Thesis

STOCHASTIC ANALYSIS OF SOME CONTINUOUS AND DISCRETE PARAMETER MARKOV-CHAIN MAN MADE SYSTEM MODELS

The thesis is divided into six chapters. Chapter one is purely introductory and the other five are analytical. **Chapter-1** provides the meaning, definition and scope of the reliability theory, system configurations, methods of improving the reliability and some stochastic processes. **Chapter-2** deals with two non-identical units. Unit-1 is operative and unit-2 is kept into cold standby. Each unit has two possible modes: normal and total failure. The repair of a failed unit is completed in two phases i.e. a failed unit first enters in phase-1 and after the completion of a phase-1 repair, it enters into phase-2 for final repair. Skilled and ordinary repairmen are always available with the system for phase-1 and phase-2 repair. Repair times of phase-1 for both the units are taken as exponential distributions whereas the repair times of phase-2 for both the units are general distributions. **Chapter-3** introduces the concept of correlation between failure and repair times of the repair machine. The system consists of two non-identical units in a parallel configuration. During the repair of a failed unit, the repair machine may also fail. In this case, the repair of a failed unit is discontinued and the repair of the repair machine is started. The joint distribution of failure and repair times of the repair machine is taken to be bivariate exponential.The failure time distributions are taken as exponential whereas the repair time distributions are taken general. **Chapter-4** deals with two identical units in a parallel configuration. A failed unit first goes to inspection to decide the failed unit needs minor or major repair. Two repairmen are always available with the system. Non-skilled repairman inspects the failed unit and does the minor repair whereas skilled repairman is available to do the major repair. The time to failure, inspection and each type of repair follow geometric distributions. **Chapter-5** consists of three identical units. Initially, one unit is operative and rests two are kept in spare as cold and warm standbys. Upon failure of an operating unit, the warm standby unit becomes operative instantaneously whereas the cold standby unit requires activation time before coming into operation/warm standby. The time to failure, activation and repair follow geometric distributions. **Chapter-6** deals with two identical units. One unit is operative and the other is kept as cold standby. Upon failure of an operating unit, the standby unit takes a random significant time to replace the operative unit. This time is known as delay time for a replacement. A single repairman can be made available at the system and he is called to come

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at the system as soon as a unit fails. The failed unit goes to inspection to decide the type of repair (type-1 or type-2). Failure, repair and inspection time distributions are taken as exponential. The arrival and replacement time distributions are taken as general.

(Dr. Pradeep Chaudhary)
Supervisor

Vaishali
(Vaishali)
Candidate

Department of Statistics
C.C.S. University, Meerut
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