Long-run availability of a two-unit standby system subjected to a priority rule

E. J. Vanderperre *

Abstract

We introduce a basic two-unit cold standby system subjected to a priority rule and attended by two different repairmen. In order to determine the invariant measure of the twin system, we employ a stochastic process endowed with probability measures satisfying general Hokstad-type differential equations. The solution procedure is based on advanced methods of complex analysis (sectionally holomorphic functions). Finally, we derive the long-run availability of the system.

1 Introduction

Standby redundancy provides a powerful tool to increase the reliability, availability and safety of operational plants, e.g. [1], [4], [12], [17 - 18].

However, redundant systems are often subjected to an appropriate priority rule. For instance, the *external* power supply station of a technical plant has usually overall priority in operation with regard to an *internal* (local) power generator in standby. The local generator is only used when the external unit is down.

Two-unit (cold or warm [1]) standby systems subjected to a priority rule and attended by a repair facility have received considerable attention in the current Literature [3], [6], [8 - 9], [13 - 16].