STATISTICAL ANALYSIS OF FAILURES OF A REDUNDANT SYSTEM WITH ONE OPERATING UNIT AND ONE STAND-BY UNIT IN WARM OPERATING STATE

Vilijandas BAGDONAVICIUS and Inga MASIULAITYTE
Vilnius University
Lithuania

Mikhail NIKULIN
IMB UMR 5251, INSERM U593, University Victor Segalen, Bordeaux
France

ABSTRACT

We consider a redundant system with one operating unit and one stand-by unit. If the main unit fails then the stand-by unit (if it is not failed yet) is commuted and operates instead of the main one. We suppose that commuting is momentary and there are no repairs.

If the stand-by unit is not functioning until the failure of the main unit ("cold" reserving), it is possible that during and after commuting the failure rate increases because the stand-by unit is not "warmed" enough. If the stand-by unit is functioning in the same "hot" conditions as the main unit then usually after commuting the reliability of the stand-by unit does not change. But "hot" redundancy has disadvantages because the stand-by unit fails earlier than the main one with the probability 0.5. So "warm" reserving is sometimes used: the stand by unit functions under lower stress than the main one. In such a case the probability of the failure of the stand-by unit is smaller than that of the main unit and it is also possible that commuting is fluent. So the main problem is to verify the hypothesis that the switch on from "warm" to "hot" conditions does not do some damage to units.