Final Project

May 30, 2016

A redundant computer is composed of three identical processing units with falure rate λ_{P} and three identical memory units with falure rate λ_{M}. The outputs of the processing and memory units are fed to a 2-out-of-three majority voter. The voter is assumed to be totally reliable.

Using the Möbius tool,

1. compute the reliability at different times for different values of failure rates. More precisely, design

   (a) an experiment with $\lambda_{\mathrm{P}} = 0.01$ and λ_{M} varying logarithmically from 0.001 to 0.1;

   (b) an experiment with λ_{P} varying logarithmically from 0.001 to 0.1 and $\lambda_{\mathrm{M}} = 0.01$.

   In both experiments, let the time vary from 1 to 99, with steps of 2.

2. Assuming a repair rate $\mu = 0.05$, compute the asymptotic (steady-state) availability for different values of failure rates, with a fault coverage probability $c = 1.0$. More precisely, design

   (a) an experiment with $\lambda_{\mathrm{P}} = 0.01$ and λ_{M} varying linearly from 0.01 to 0.1, with steps of 0.1;

   (b) an experiment with λ_{P} varying linearly from 0.01 to 0.1, with steps of 0.1, and $\lambda_{\mathrm{M}} = 0.01$.

   If an experiment does not converge, formulate an explanation.

Every student will present his or her implementation of the project at the oral exam.