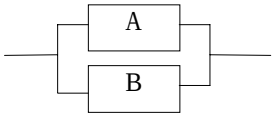
S-38.110 Telecommunication Switching Technology I, Exercise 5

Brax/Ilvesmäki, 9.3.2000

The answers are to be returned before the exercise begins either to the exercise assistant (in person or via email to lynx@tct.hut.fi) or to a box underneath the lab's noticeboard.

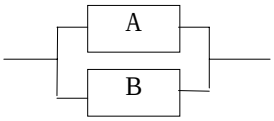
Task 1

Standby passive redundancy: In the normal case the both sides A and B are working parallely so, that another of the sides, A or B, is taking care of the whole load, and the other one is standing by. For both sides is the failure rate = λ and the repair rate is μ. When the active side fails, and the standby side takes care of the load. When both sides are failed, the system is failed. When the whole system is failed, there is no repair function done. Draw the Markow state model for the system.



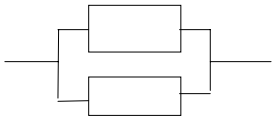
Task 2

Parallel active redundancy: In the normal case the both sides A and B are working parallelly, and they are sharing the load. For both sides is the failure rate = λ and the repair rate is μ. Then one of the sides, A or B, fails, and after that the working side is taking care of the whole load. That means, that it has now larger failure rate $\lambda' >= \lambda$. When both sides are failed, the whole system is failed. When the whole system is failed, there is no repair function done. Draw the Markow model for the system.



Task 3

Define the Markov model and write the equations for steady state probabilities for the following parallel duplication arrangement. The system fails when both of the elements have failed.



Task 4

Define the Markov model and write the equations for steady state probabilities for the following serial and parallel duplication arrangements. The system fails, if one of the elements A1 or A2 on side 0, or element B on side 1 fails.