CONCLUSION

The Markov process defined here has the following properties:

1. It removes the sources of computation error due, in particular, to the high value of the ratios between the repair and failure rates (of the order 10^3 to 10^6).
2. It gives the possibility of obtaining simply the measures of the derived reliability by the use of approximate expressions established for homogeneous processes [8, 9].

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J.C. Laprie//L.A.A.S.//7, avenue du Colonel Roche//31400 TOULOUSE FRANCE

J.C. Laprie was born in Paris, France, on 1944 December 22nd. He received the Engineering Diploma of the "Ecole Nationale d'Ingénieurs de Constructions Aéronautiques" in 1968 whereupon he entered the "Laboratoire d'Automatique et d'Analyse des Systèmes" of the "Centre National de la Recherche Scientifique" at Toulouse. He presented his "Docteur-Ingénieur" thesis in 1971 and his "Docteur ès-Sciences" thesis in 1975, both of them in Automatic Control. He is presently head of the research team "Automatismes Numériques" whose main interests are the modeling and architecture of reliable digital structures.

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Correspondence

Correspondence items are not refereed

Fast Algorithm for Reliability and Cost of a Complex Network

We make the following three comments in connection with recent papers by Agarwal et al. [1, 2].

1. A systematic method of determining reliability of a complex network considering success paths has been described in [1]. The same analysis applies to failure analysis using cutsets of the network, since

$$U = \Pr\{E_1 \cup E_2 \cup E_3 \ldots\}$$

where U is the failure of the system, E_1, E_2, E_3 ... are events that all branches in cut-sets C_1, C_2, C_3 ... respectively have failed and $R \equiv 1 - U$ is the reliability of the system.

2. The knowledge of the cut-sets is important and useful in allocating individual branch reliability and when trying to improve the reliability of a system. In Fig. 1 of [1], $\{A, F\}$ and $\{C, G\}$ are the minimum cut-sets, and reliabilities of the elements of these sets contribute most to the system reliability. Also, elements of the largest cut-sets which are not common in other smaller cut-sets contribute the least.

3. A cost-reliability relation was suggested in [2]. We suggest another relation

$$C_i = K_i \left(\frac{p_i}{1 - p_i}\right)^{r_i}$$

where C_i and p_i are respectively the cost and reliability of branch i of the network and K_i and r_i are positive constants whose values depend on the type of component used. The relation is simpler, satisfies the four conditions stated in [2] and requires less time to compute.

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D.Dutta Majumder//Electronics and Communication Sciences Unit// Indian Statistical Institute//Calcutta 700 035 INDIA.

S.K. Pal//Electronics and Communication Sciences Unit//Indian Statistical Institute//Calcutta 700 035 INDIA.

B.B. Chaudhuri//Electronics and Communication Sciences Unit// Indian Statistical Institute//Calcutta 700 035 INDIA.