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APPLICATION OF SUPPLEMENTARY VARIABLES AND LAPLACE TRANSFORMS IN OPERATIONAL BEHAVIOUR AND RELIABILITY OF A MULTI-COMPONENT STOCHASTIC SYSTEM

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Validity of such organization behaviour, in this paper, was tested by optimal solutions linear programming model. Results of such an analysis also enable organization development and behaviour to be forcast. Apart from this one could get a measure of quality of the development structure of activities of single organizations.

Research results should also effect a bigger O.R. usage as an explicative discipline.

PAPER 72: APPLICATION OF SUPPLEMENTARY VARIABLES AND LAPLACE TRANSFORMS IN OPERATIONAL BEHAVIOUR AND RELIABILITY OF A MULTICOMPONENT STOCHASTIC SYSTEM

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The present paper discusses a multicomponent system consistting of two classes of components, i.e. of two subsystems S_1 and S_2. Sybsystem S_1 contains M identical redundantly connected components while S_2 is composed of N independent, in general different, components connected in series.

Components in S_1 fail according to some general distribution (the failure rate of components is an arbitrary function of time) while in S_2 the components have constant failure rates. A failed component has to wait for the repair facility, the waiting time obeys some general distribution (each component has a distribution of its own). All the repair time distributions of the system are governed by general probability laws, too.

Operational behaviour of the system has been studied under different conditions. The conditions are specified by two policy variables: the type of redundancy (hot or cold) and the repair policy to be followed (opportunistic or minimum policy). The supplementary variable technique is used to obtain the partial differential-difference equations for the behaviour of the system. With the help of Laplace transforms, generating functions and inverse Laplace transforms both time-dependent and steady-state solutions for these state equations are found. From these solutions the availability for the system is derived.

Further it is shown that the steady-state solutions are independent of the type of waiting time and repair time distributions, only the mean values of these random variables appear in the steady-state solutions. In the end, effects of the type of redundancy, the repair policy and the number of redundant components in subsystem S_1 have also been studied.

PAPER 73: STRATEGIC CHOICE IN INTER-CORPORATE PLANNING

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Problem situations which cut across the specific domains of several individual agencies are increasingly recognised as important. Tackling them implies the derivation of appropriate new methods of analysis.

Our paper will discuss the decision-centred approach developed within IOR. The linkages between technical content and the social and organisational structure of problems will be introduced via the "Strategic Choice" methodology. The Analysis of Interconnected Decision Areas will be presented as an approach to structuring the technical content of problems.

The concept of a policy system will also be introduced, and the need to manage uncertainties in its environment discussed. An effective classification of uncertainties to facilitate information seeking leads in turn to discussion of the process of interaction between policy systems, and thus to the key concepts of Decision Networks. The advantages, and difficulties, of applying this kind of approach will be discussed in terms of three particular examples.