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the loss probability). Explicit formulas for e are given for small K's and T's, where T is the upper bound of the service time. Tables of e are calculated for a set of bounded service time distributions, both the exact values ant the approximate ones, obtained by replacing the true distribution by a geometric one. The same is done for the system D/GI/K/0/*, a modification of the preceding one, characterized by simultaneous servicing of two consecutive customers by one server.

Both systems are then utilized as models for the Robbins-Monro and the Kiefer-Wolfowitz stochastic approximation procedures with delayed observations and with allocation of observations into K parallel series. The results achieved for the mentioned systems enable us to conclude about the efficiency of both stochastic approximation procedures and they provide a recommendation for the choice of the number of series K. Moreover, statistical properties of both approximation procedures are studied, in particular the asymptotic normal distribution and the efficiency in the sense of the asymptotic estimation theory.

TIME SERIES WITH RANDOM PARAMETERS

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The present work is devoted to the study of some special models of autoregressive sequences with random parameters. In the main focus are the questions of weak stationarity and the covariant structure of this kind of processes. The following results have been obtained.

We have found conditions for weak stationarity in case of a multidimensional generalized model of an autoregressive sequence with independent random parameters, and shown that each of the models of this kind is matched by a basic model enjoying the same covariant structure.

Next we have described in detail two types of one-dimensional first-order autoregressive sequences with the parameters themselves forming a one-dimensional sequence of moving averages, of the first order as well. One of these types has been generalized to the case of an autoregression of a higher order. We have succeeded in proving that any interdependence occurring among the parameters substantially influences the stationarity of the process. There is a stationary solution but if the random parameters satisfy some very special conditions. The covariance structure of all of such models was always identical with that of one of the classical random sequences, either the white noise or the classical autoregression. This similarity has been extensively exploited for the calculation of the inverse of the variance matrix and for the derivation of the form of the best linear prediction in a finite series.

In the concluding chapter we investigate two of the models mentioned, namely, the ones with the covariance structure of white noise. We show that in the case of the autoregression of the first and second order, the processes of the squares of these sequences possess the covariance structure of the classical autoregression of the respective order. However, in order to obtain conditions of stationarity for the processes of squares we first have to solve the multidimensional finite moment problem, which remains open.

The results established here can be utilized in the first place in the theory of time series with random parameters.