The original package of programs on the statistical analysis of passive observations and the designed experiment and its application in the sociology, the radiational medicine, for the complex industrial objects and the technological processes is developed.

An Integrated Simulation and Sensitivity Estimation Program for Queuing Networks Analysis

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An interactive software tool that assists the user in both analyzing and improving the performance of stochastic queueing networks is described. It provides an efficient way of simulation combined with procedures of estimating the gradient of network performance measures. The gradient estimation procedures are based on the perturbation analysis technique (see [2]) and related results in [1].

The program is supplied with user friendly interface and Network Description Language developed to simplify describing various framework of simulated networks as well as functions of real parameters which define the random service time for each server in the network. One may also define any function of the service completion times as the performance measure. As a result of each simulation run, the estimates of both the performance measure and its gradient are displied. After analyzing the results, especially gradient information, the user may change the parameters to improve the network performance, and start the next run.

The program is coded in the C programming language and tested on an IBM PC/AT microcomputer.

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Universal Scheme of Regulations in Biosystem of the Postsynaptic Potential (PSP) Amplitudes Distribution as an Example

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The real observation is of kind $\nu = Q\xi + \varepsilon$ where $\varepsilon \sim N(O, \sigma)$ is a technical noise, ξ is an unknown discrete random variable, describing the total quantum structure of PSP, Q is the quantum dimension, xi and ε are independent.

The description of regulations is based on the following general principle of reflections [1] in a strictly regulated system the interactions are described by the processes, whose trajectories are reciprocally reverse (in general meaning). One – dimensional distributions of the processed are fiducial (after Fisher).

The application of this principle to the Bernoulli scheme leads to the generalized positive $\beta^*_+(k|n,p,\alpha)$ and negative $\beta^*_-(n|k,p,\alpha)$ binomial distributions [2] by means of introducing a parameter α $(0 \leq \alpha \leq 1)$, enumerating all the inverse images in the procedure of the generalized reverse. $\beta^*_+(k|n,p,\alpha)$ describes [3] the comulative effect ξ of the work of a number of synapses in the interneuron contracts (generator noise). The parameter $\alpha = s/m$ being a rational one, s and m give the size and the structure of the aggeregations of synapses into blocks, so α is a measure of tolerance of the biosystem components. Being $s = 1$, $\beta^*_+(k|n,p,1/m)$ turns into a usual binom, if $s = 2$ it is closely connected with Fibonacci series.

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