

Systems Research Institute, Polish Academy of Sciences

Preprints

TRANSITION TO ADVANCED MARKET ECONOMIES



Abstracts

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SESSION 15

OR: PROBLEMS AND SOLUTION METHODS

Part 15A

INVENTORY MODEL WITH STOCHASTIC PRICE

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In this paper, the multi-period inventory model with stochastic price is discussed, and some results on minimum mean cost and minimum-risk are obtained.

COST CHARACTERISTICS OF SYSTEM SERVICE WITH INPUT CONTROLLED BY MARKOV CHAIN

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The limit cost characteristics for a system consisting of N computers serving computational tasks are defined and determined. The tasks arrive with random intervals of time. These intervals have the same probability distribution. The calculation times are also random with the same probability distribution for separate computers.

Markov chain is the mathematical model of the process of allocation of computational tasks to computers. The total cost of service per unit of time and some estimation of total cost of waiting the computational tasks are calculated. These characteristics can be used to formulate and solve some optimization problems.

A COMPUTER MEMORY SHARING PROBLEM

Ryszard Antkiewicz and Tadeusz Nowicki

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A multitask computer system with shared memory is described. This memory is considered to be limited. Initially it is separately shared between every tasks as separable memory areas.

Each task generates random stream of data which fills the memory area connected with it. When any memory area is filled with data, system must be reorganized.

The problem is formulated and solved of how to share the limited memory between tasks in order to maximize the expected time until the system reorganization.

OPTIMAL PERIODIC EXHAUSTION BUFFER STRATEGY

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Many different buffers are used in computer systems, specially in transmission units. The rhythmical transmission system working is connected with identical work of buffer. It is very useful for a management system, specially in computer networks, when buffers are exhausted periodically. These buffers have most often the software nature, so that someone can change their parameters.

Mathematical model of buffer exploitation is described. Periodic buffer exhaustion strategy is defined. The problem of choosing optimal buffer parameters for this strategy of minimization of expected value of unit cost transmission is formulated. The method is proposed for solving problem formulated.

QUALITY PROVIDING COMPLEX SYSTEM MODELS FOR DIFFERENT REGIMES OF FUNCTIONING

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It is characteristic for complex systems that their functioning and development occur in conditions of conflict related interaction.

An approach is suggested that uses conflict as a state defined the difference in goals between interacting sides and as a system forming factor.

This contradiction can be one of the major criteria of the complex system analysis and synthesis.

In some suggested models the of contradictions are accounted for on the basis game theory models of decision making optimization.

From the game theory point of view one ought to start from the principle of finding the optimum of the effectiveness function with the assumed risk or a possible win.

Three system functioning regimes of are considered.

The first regime is : the centre (top level) of the system has no information about behaviour of a lower level in the given period of functioning. Decision making is carried out on the basis of a priori data about the system and the data estimated on the basis of the criterion of a guaranteed win.

In the second regime the centre receives the information about decisions of a lower level. Then the centre should make its decision with minimal risk (losses).

The third regime is defined as follows: having information about the lower level behaviour the centre transmits its decision to the lower level. There, a two sided connection between interacting sides take place.

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