Kh.B. Kordonsky I.B. Gertsbakh. Using Entropy Criterion for Job-Shop Scheduling Algorithm, *TRANSPORT and TELECOMMUNICATION*, vol. 3, No 1, 2002, pp. 8–11.

We have a set of M jobs, the j-th job has duration l_j and must start within the time interval $[a_j,b_j]$, $j=1,...,M$. Every job must be performed without interruption, each machine can perform every job and only one job can be performed in a given time on a given machine. A sequential greedy-type algorithm is proposed for finding the "optimal" starting time for each job, which minimizes the maximal number of machines needed to perform all jobs. This algorithm is using the entropy criterion for finding the "best" position for jobs. Algorithms with similar ideas were implemented in designing the Aeroflot Aviation scheduling.

Keywords: entropy criterion, scheduling, greedy-type algorithm

E. G. Frankel. Reliability of Cost and Time of International Trade Logistics, *TRANSPORT and TELECOMMUNICATION*, vol. 3, No 1, 2002, pp. 12–19.

The costs of international trade, and in particular trade in break bulk goods, have grown rapidly in recent years. The rapid expansion of these trades introduces new challenges. Most important among them is control of logistics costs and service quality. The recent emergence of B-to-C e-commerce, which was expected to revolutionize retail marketing, for example, has fallen prey to the underestimate of logistics costs and complexities.

Reliability of cost and time of international trade logistics are discussed in the paper.

It is shown that the major technological and management advances in the logistics of international trade have been successful in integrating modal transport and improve supply chain management.

Keywords: trade logistics, logistics costs, e-commerce

A. Grakovski, Yu. Barinov, A. Alexandrov. Problems of Processing of the Information in Transport Telematics Systems, *TRANSPORT and TELECOMMUNICATION*, vol. 3, No 1, 2002, pp. 20–25.

The globalisation of markets in conditions of different cultures derivate rather complex information problems. The sciences about complexity – fractal geometry and theory of the determined chaos, - offer new tools of the analysis of open systems. By more formal consideration this new paradigm appears by generalization of existing methods of processing of the information and allows solve some problems of transport telematics. The new complex models combine fractals, chaos and non-linear methods. This new sight reduces opportunities of the control in quickly varying situations, increases uncertainty and, at the same time, offers a general picture, how the world market works.

Keywords: telematics, self-organization, information, open system, fractal, chaos

B. Misnevs, D. Daineko. Developing a New Testing Model, *TRANSPORT and TELECOMMUNICATION*, vol. 3, No 1, 2002, pp. 26–33.

Testing models implementation at software engineering practice is analyzed. A kind of test model classification is suggested. Life-cycle oriented testing models and formal methods oriented models as well as product type oriented models are discussed. A possibility of testing automation regarding the selected model is analyzed. Practical methodologies are investigated to

define a suitable testing model. Requirements for the appropriate testing model selection are formulated.

Keywords: testing model, software engineering, requirements

I. Kabashkin. Test Strategies for Communication Channels of Air Traffic Control Systems, *TRANSPORT and TELECOMMUNICATION*, vol. 3, No 1, 2002, pp. 34–38.

Communication is one of the most important domains of air traffic control system from flight safety point of view. The most fundamental and difficult problem is providing reliability and fault tolerance of such systems.

Paper investigates reliability of repairable voice communication channels (air/ground and ground/ground) of air traffic control systems with periodical sessions of communications.

Three different test strategies is described:

1. Communication channel does not have built-in-test equipment.
2. Communication channel has built-in-test equipment with diagnosis procedures during communication sessions.
3. Communication channel has periodical test in the pauses between communication sessions.

Marcovian models are studded and communication channel availability is examined for each of above mentioned test strategies.

Some numerical examples of real communication systems are presented.

Keywords: test, communication channel, air traffic control

Yu. Paramonov, M. Kleinhof. Modelling of Strength and Fatigue Life of Fiber Composite Material, *TRANSPORT and TELECOMMUNICATION*, vol. 3, No 1, 2002, pp. 39–47.

Some simple statistical model for fatigue life of composite material consisting mainly of parallel rigid components (strands) is offered. The model, which can be in some way considered as extension and specification of Daniels's model for composite material, allows to get S-type curve of internal stress growth and, finally, to see the connection between static strength distribution parameters and S-N fatigue curve (Wholer curve).

Keywords: composite, strength, fatigue, fatigue curve

N. Nechval, E. Vasermanis, K. Nechval. Finding Sampling Distributions for Truncated Laws via Unbiasedness Equivalence Principle, *TRANSPORT and TELECOMMUNICATION*, vol. 3, No 1, 2002, pp. 48–56.

The problem of finding sampling distributions for truncated laws remains today perhaps the most difficult and important of all the problems of mathematical statistics that require considerable efforts and great skill for investigation. The technique discussed here is based on use of the unbiasedness equivalence principle in mathematical statistics and often provides a neat method for finding sampling distributions. It avoids explicit integration over the sample space and the attendant Jacobian but at the expense of verifying completeness of the recognized family of densities. Fortunately, general results on completeness obviate the need for this verification in many problems involving exponential families. Examples are given to illustrate that in many situations this technique allows one to find sampling distributions for truncated laws by simple way.

Keywords: truncated law, sampling distribution, unbiasedness equivalence principle

Yu. Paramonov, K. Nechval, V. Abramov, A. Glagovsky. Fatigue-Pron Airframe Item Inspection Modelling by the Use of Monte Carlo Method, *TRANSPORT and TELECOMMUNICATION*, vol. 3, No 1, 2002, pp. 57–61.

For some simple cases it is easy enough to get formula for fatigue failure of fatigue-pron airframe item under some inspection program. But for more general cases it is useful to make modelling of inspection process by the use of Monte Carlo method. The special PC program was constructed for this goal. This program includes the parameter estimation, inspection modelling and failure probability estimation. For distribution parameter estimation the data of full-scale fatigue test results are used. These data are given by Iljushin design bureau.

The system is not finished yet. In this paper only two main parts of it are considered: fatigue crack growth function parameter estimation and fatigue failure probability calculation under fixed inspection program.

Keywords: Fatigue, airframe, test, maintenance, probability

V. Rastrigin. Statistical Estimation of the Parameters of Training Models, *TRANSPORT and TELECOMMUNICATION*, vol. 3, No 1, 2002, pp. 62–67.

The training model is considered with combined training and knowledge level examination cycles. Elementary observation is represented by the answer to the question suggested, and the result observer is thus binary variable (correct/incorrect). At the same time demonstration (confirmation) of the correct answer serves as the elementary training step, which changes the probability of a correct answer in the future.

The approach to the statistical estimation of the parameters of the model described is suggested. Parametric and non-parametric maximum likelihood estimates are considered. Computational aspects of the problem are discussed.

Keywords: training models, statistical estimation, incomplete observations, lifetime

E. Vasermanis, N. Nechval, K. Nechval. New Objective in Inventory Control Problem, *TRANSPORT and TELECOMMUNICATION*, vol. 3, No 1, 2002, pp. 68–74.

In the classical statement of the one-period inventory problem, one determines the optimum order quantity to maximize the expected profit. In this case, the variability of costs – or benefits – resulting from different inventory policies is completely ignored. In order to take into account the 'riskiness' of the inventory policies, in the literature two alternative objectives were proposed.

This paper considers the inventory problem under the new objective. This objective – "maximizing the expected profit multiplied by the probability of reaching or exceeding its value" – is commonly adopted by managers but largely ignored in the literature. To illustrate the proposed criterion, a numerical example is given.

Keywords: inventory, control, new objective

V. Pavelko, E. Ozolinsh. Detection of a Fatigue Crack by Method of an Acoustic Emission, *TRANSPORT and TELECOMMUNICATION*, vol. 3, No 1, 2002, pp. 75–84.

The suppositions on AE conformity to phases of fatigue fracture development are made at the base of AE process formation self-similarity postulate and of one of microcrack system configuration stability at the polycrystalline material. The calculations under the offered model do not contradict experimental data obtained at the aluminum alloy.

Keywords: fatigue, material, crack, acoustic emission

V. Kargin. Major Trends in the Transport Sector of Latvian Economy: Statistical Analysis, *TRANSPORT and TELECOMMUNICATION*, vol. 3, No 1, 2002, pp. 85–88.

The Baltic States have made significant progress in modernizing their transport sectors during last ten years. The achievements in this area will help to promote economic growth in the region.

In the roads and road transport sector, the urgent needs are to expedite border crossings, improve training for road transport operators, enhance road safety, and develop better highway links between poorer areas and main centres.

The principal needs are to reduce over-capacity, rationalize tariffs, raise levels of safety, and improve railway service with regard to railways.

In the aviation sub-sector, there is need to improve administrative procedures, improve service, modernize aircraft fleets, complete the reconstruction of the airports.

Concerning maritime transport, the principal requirements are to facilitate the anticipated significant expansion of maritime traffic at Baltic ports, improve safety in handling cargo, and enhance environmental protection.

The principal needs are to mitigate the deterioration of public transport facilities; to alleviate traffic congestion on city streets and to secure a stable source of funding for urban transport.

Case study for Latvia is discussed in the paper.

Keywords: transport, investment, statistical analysis

H. Afanasyeva. The Resampling-Estimator of the Queuing Length Non-Stationary Distribution for the Queuing System M/G/∞, *TRANSPORT and TELECOMMUNICATION*, vol. 3, No 1, 2002, pp. 89–94.

The queuing system M/G/∞ is considered: the Poisson flow of customers' arrivals, general distribution of service times, infinite number of servers. Two sample populations are available: $A_1, A_2, ..., A_k$ is sample of times between arrivals and $B_1, B_2, ..., B_l$ is sample of service times. Our aim is to evaluate the non-stationary distribution of queuing length X(t) for the time moment t (the number of customers in the system at the time moment t), if originally the system is empty: $P_i(t) = P\{X(t) = i \mid X(0) = 0\}$. Two approaches are considered: traditional and Resampling. It is shown that suggested Resampling approach could be a good alternative to usual one.

Keywords: queuing system, queuing length, resampling, estimation

K. Nechval, N. Nechval, E. Vasermanis, V. Makeev. Constructing Shortest-Length Confidence Intervals, *TRANSPORT and TELECOMMUNICATION*, vol. 3, No 1, 2002, pp. 95–103.

In this paper, we present an approach to invariant confidence intervals that emphasizes pivotal quantities. We consider confidence interval problems that are invariant under a group of transformation G such that the induced group $\overline{\mathrm{G}}$ acts transitively on the parameter space. The purpose of this paper is to give a technique for deriving confidence intervals with a minimum length property. Examples illustrating the use of this technique are given.

Keywords: confidence interval, shortest length, technique for constructing

V. Shelkovnikov. Moving Objects Information Provision Quality Growth Due to the Electrodynamic Screens Application in the Ferrite Receiving Antenna, *TRANSPORT and TELECOMMUNICATION*, vol. 3, No 1, 2002, pp. 104–113.

The research paper gives the expression of the margin sensitivity of the receiving ferrite aerial showing the practical ways of constructing the highly effective receiving ferrite antenna.

The work investigates the influences on the losses in the internal electrodynamics screen aerial displayed in the longitudinal metallic stripes on the ferrite core. The fact that the internal electrodynamics screen decreases the losses in the aerial is proved experimentally and theoretically.

The conclusion was drawn that to increase the reliability of the radio communication with the movable objects – the latter should use the small – size receiving ferrite antenna of the increased interference protection

Keywords: electrodynamics screen, ferrite antenna, interference protection, moving objects

V. Yeremeyev, A. Matveyev. High-Performance Nonrecursive Digital Filters without Multiplications, *TRANSPORT and TELECOMMUNICATION*, vol. 3, No 1, 2002, pp. 114–121.

New method for design of high selective narrow-band lowpass digital filters (LPFs) with linear phase is described. This technique presents possibility of special class synthesis of arbitrary order Finite Impulse Response (FIR) filters implemented without multiplications. This improvement means high computational efficiency and increase of the computation speed. Synthesized filters have unified structure components and any order filters provide wide dynamic range of processing data.

Keywords: digital signal processing, fast filtering

M. Fioshin. Resampling Estimators of Hierarchical Reliability Systems, *TRANSPORT and TELECOMMUNICATION*, vol. 3, No 1, 2002, pp. 122–126.

This paper illustrates application of Hierarchical Resampling method for simulation of hierarchical sequential-parallel reliability systems in the case when the same sample population for some elements is used. Modifications of Hierarchical Resampling method are proposed for given task. Formulas for variance of estimators are given. Obtained estimators are compared with traditional ones calculated using empirical distribution functions. It is shown that considered approach can be a good alternative to traditional one.

Keywords: resampling, hierarchical, estimators