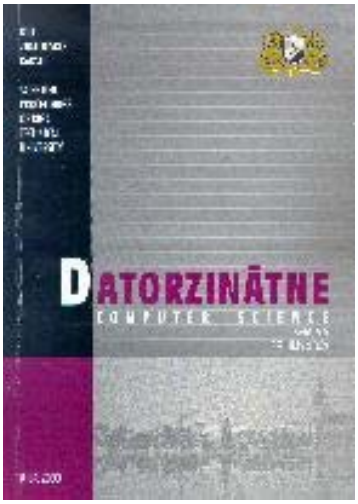

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Abstracts

Otremba Z. Simulation of the contrast of the sea areas polluted by oil spilled on the surface and dispersed in the water column.

This paper presents the results of the modeling of reflectance function of the sea polluted by oil that appears as film and as suspensions of droplets. The film thickness is 5 mm, which relates to 5 cm3 of oil per 1 m2 of sea area. The same amounts of oil in the water column in relation to the sea unit area as for film were applied for various thicknesses of sea-layer polluted by dispersed oil. The calculations were made by the simulation of the life of a big number of photons falling on the sea surface (Monte Carlo method). Non-monotonic dependence of the thickness of the oil 'cloud' in the bulk of sea on the reflectance was detected. (pp. 6-12)

Herb P., Graeber P.-W., Kemmesies O. COMBESICK - A computer-based decision support system for seepage prognosis.

Soil and groundwater are important natural resources. Due to increasing demand for soil and groundwater, their limited capacity, and the difficulties of remediating these resources once contaminated, their protection has become increasingly important. As a result, in 1999 the German legislator introduced the so-called Bundes-Bodenschutzgesetz (BBSchG) - a law regulating the protection and remediation of soil in Germany. According to the BBSchG a seepage prognosis has to be conducted if contaminant concentrations in the soil exceed values specified in the BBSchG. The purpose of the seepage prognosis is to determine potential groundwater contamination originating from surfecial contaminated sites. Computer-based simulation of contaminant transport in the unsaturated zone is an indispensable, cost-effective method of conducting a seepage prognosis. We suggest a decision support system for seepage prognosis (COMBESICK) which will be easy to use, widely available, and less error-prone than previous seepage modeling software. (pp. 13-19)

Spalvins A., Slangens J., Janbickis R., Lace I., Hein P. Modelling of remeditation tools for the contaminated Bernau place, Germany. Modelling of Remeditation Tools for the Contaminated Bernau place, Germany

The Bernau place (located ~ 50 km east of Berlin) is heavily polluted with trichlorethene (TCE). To help in solving the remedy problem of the place, a system of hydrogeological models has been developed by the Environment Modelling Centre of the Riga Technical University. The paper summarizes information by modeling TCE - transport if various remediation tools (drains, reactive walls, wells) are applied for cleaning the place. Advantages and drawbacks of these tools are explained if they are used for long term (10 - 20 years) remediation of the soil and groundwater of the Bernau place. (pp. 20-28)

Spalvins A., Slangens J., Janbickis R., Lace I. Novel interpolation tools for creating hydrogeological models.

The quality of a hydrogeological model (HM) depends not only on credibility of initial data, bat also upon interpolation technologies applied to create HM. The Environment Modelling Centre of the Riga Technical University has developed a system of reliable interpolation tools. It contains the following interdependent items: the geological data interpolation (GDI) program for obtaining principal elements of the HM system; line data for GDI is prepared by so called crosspoint (CRP) program; the special program has been developed for interpolation of input and output data for sites, not matching the grid nodes of HM; the shell of the HM grid acts as an interpolator for boundary conditions. In the paper, theoretical ideas implemented into these tools above are explained. (pp. 29-35)

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The problem of unsteady viscous incompressible flow in an infinitely long pipe of a circular cross section is considered in the paper. The unsteady flow is caused by the change of the velocity and pressure in the fluid. The fluid flux through the cross section of the channel decreases to zero during a finite time interval. It is assumed that the flux change is described by a linear function of time. Such a model corresponds to the real case of fluid flow in a pipeline. It is shown that the flow has minor changes in the central part of the channel while sudden changes of the velocity and pressure occur in the boundary layers near the wall of the pipe. An analytical solution of the problem is found under the assumption that the velocity

vector has only one nonzero longitudinal component which is a function of radial coordinate and time. The solution is found by the method of the Laplace transform. The inverse Laplace transform is found by means of the residue theorem. The solution is found in the form of a series containing Bessel functions. The velocity distribution is calculated as a function of time and the parameter which characterizes the rate at which the flux reduces to zero. The results are compared with the solution of a similar problem in the case where the fluid flux is set to zero instantaneously. (pp. 36-42)

Volodko I. Usteady viscous flow in an annulus.

Unsteady flow of a viscous incompressible fluid in the region between two infinitely long concentric cylinders is considered in the paper. The flow unsteadiness is caused by a sudden change of the velocity and pressure in the fluid. The fluid flux through the cross section of the channel is set to zero instantaneously. As a result a fully developed Poiseuille flow is modified and boundary layers start to develop near the walls of the channel. Analytical solution of the problem is found under thecondition that the velocity vector has only one nonzero longitudinal component which is a function of radial coordinate and time. The Laplace transform is used to solve the problem. The inverse Laplace transform is found by means of the residue theorem. The solution is found in the form containing Bessel functions and is suitbale for calculations. (pp. 43-47)

Antimirov M. Ya., Dzenite I. A. New formula for impedance change in three-dimension case.

New formula to the impedance change for the case of a flaw of an arbitrary form located in a conducting half-space and of the closed emitter of an arbitrary form located in the horizontal plane above the conducting half-space, is obtained. The Green's formula is used in contrast to previous authors. It is noted that similiar formula for impedance obtained by previous authors using the Lorentz theorem is not correct in common case. (pp. 48-53)

Antimirov M. Ya., Dzenite I. A. Exact solution for the problem on impedance change of a rectangular frame with current inside a cylindrical tube.

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Bleiers J., Lavendels J., Latisheva E., Misans P. Using of the sample buffers in the hard real time signal processing environment of telecommunication system.

Architecture for multiprocessor signal processing environment for telecommunications system is discussed in this paper. Using of the sample buffers may increase the promotion of signal processing system. With one execution of the each signal processing routine the large amount of signal samples are processed. From the other side using of the signal buffer produce the delay time for each signal sample processing The admissible delay time of sample processing is determined for each kind of signal process.The target of this paper is performing detection of the decay time for multiple signal processing system with sample buffers.The obtained results allows to optimize signal processing software in multiple signal processing system. (pp. 63-68)

Bleiers J., Lavendelis J., Kalejs A., Veselis N. CT-bus oriented testing and debugging for DSP multiprocessor telecommunication board.

Some aspects of development of computer telephony (CT) bus based digital signal multiprocessor are described in this paper. Various CT-bus standards provide a time-multiplexed serial data flow between CT-bus devices and require special development and testing tools. Wide known debugging tools include the software simulators, debugging modules and emulators, JTAG boundary scan ports as well as using of particular CT-bus design tools. As a way for testing and monitoring the bus hardware and software, using of CT-bus tester and signal processors with CT-bus compatible peripherals is proposed and discussed. The tester is a multifunctional device that can produce various test signals for bus equipment and analyze data received from the bus. Analysis of data can be executed due to internal or external hardware. Effective mode is to generate a random data flow by CT-bus tester and analyze a bit error rate in the received data flow. The loop-back based testing

configuration includes a CT-bus oriented tester, multi-DSP environment, time-slot interchanger and external peripheral modules. External modules based on the ADC and DAC converters support a loop-back between signal processors. The described configuration is used for multiprocessor signal processing board designed for telecommunication needs. (pp. 69-72)

Burovs G. The structural disbalancement of regression models of dynamic objects identification.

The methodical errors of regressive model of identification of dynamic objects are investigated. The errors are determined as disbalancement of model. It is defined by mismatch exogenous and auto regressive parts. First is connected to occurrence of errors of signals quantization. Second is connected to discrepancy about model and structure of an output signal. The conclusion about expediency of application in test modes on different intervals of an output signal of local regressive models is made. (pp. 73-82)

Burovs G., Andersons K. The operative estimation of computing stability of signals discrete processing algorithms.

The accuracy of identification is defined by computing stability of algorithms, which depends on a processable signals dynamics. Therefore it is offered to use algorithm computing stability parameters for a filtration of the information acting in identification model. Classical methods, connected with an estimation of conditionality numbers unsufficiently high-speed. They can not work in a real time scale. For this purpose the method based on an estimate of norms of signals differences is offered. Is shown, that output signal differences can be used in identification model. (pp. 83-90)

Andersons K. Use of recurrent relations in dynamic control models of analog objects.

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sample. The offered method is expedient for applying in test modes of the dynamic control. (pp. 90-99)

Vizulis P. Difference correlation models of the control of analog dynamic objects.

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Burovs G. About drawbacks of the Vulf-Rastrigin "associative algorithm".

Drawbacks of the "associative algorithm ", advertised in Vulf"s and Rastrigin"s papers [1,2] are considered. The erroneous axiom is accepted that the mapping of diverse information spaces have universal linear character. Such appendices of the algorithm are offered, where it is impossible to check up reliability of obtained results. The practical realization of the algorithm is impossible, because it is based on the inversion of matrixes close to singular ones. Models for identification of dynamic objects are based to on recurrent relations. Thereby it leads to results having no real sense.(pp. 108-117)