

Automation of oil-and-gas technologies

G.N. Kurlayev

MODELING OF CLEANING PROCESS USING HYDROIMPULSIVE EFFECT

The article considers a question of creating model of bed's wellbottom zone pollution under lifting of mechanical impurities, as well as using it in cleaning technology development.

Modeling, stimulation of inflow, hydroimpulsive effect, mechanical impurities.

A.A. Kazakov

SAMPLING CONTROL FOR WELLS WITH BOTTOM WATER

The article describes dynamic model of substituting oil in local zone of reservoir with bottom water under coning, using hoist model (with electric pump). The model considers construction details of wells as well as pump dimension type, supporting different production conditions. Subject to consideration being quality performances and optimality criteria regarding choice of efficient variant for completion of wells, as well as choice of pump equipment and assignment of production conditions.

Oil well, pump, coning, bottom water, dynamic model, anisotropy, water permeability, coefficient of oil recovery, production system, real time.

D.A. Vlasov

TECHNOLOGY OF LSM-EVALUATION FOR DYNAMIC SYSTEMS WITH DIFFERENT RATE DYNAMICS

The article considers a question of correctness regarding identification of systems with different rate dynamics. Subject to suggestion and investigation being technology of LSM-evaluation of such systems based on regularization of information matrix of decision rule.

Identification, different rate dynamics, LSM (least squares method), regularization, information matrix, conditionality, stability.

D.A. Govorkov, G.N. Kurlayev

TECHNOLOGY OF ANALYSIS REGARDING PRODUCTION CONDITIONS OF WELL WITH ELECTRIC PUMP UNDER REAL TIME

The article considers a variant of implementing technology analyzing production conditions of well with electric pump under real time, enabling to perform complex diagnostics regarding state of the system, including the first cause in the change of productivity, together with evaluation of resource.

Well systems, well productivity, resource of submersible drilling rig.

A.V. Avilov, V.E. Borzykh, I.V. Fyodortsov

AUTOMATION OF ANALYTICAL PROCESS REGARDING INVESTIGATION RESULTS ON CORE AND CLASSIFICATION OF ROCKS

The article is devoted to description of classification process regarding rocks and problems arising at that. Subject to separation being basic functions and structure of basic elements of automated system under development, illustrated by examples of implementing basic blocks of the system.

Classification of rocks, lithotype, automated system.

A.B. Zhuravlev, A.L. Portnyagin

QUESTIONS OF CALCULATING NUMBER OF MAINTENANCE PERSONNEL AT ENTERPRISES OF OIL AND GAS COMPLEX

Subject to consideration being questions connected with labor planning and maintenance of equipment at enterprises of oil and gas complex under conditions of Far North and shift team labor method. The article gives a brief review of existing approaches toward solution of these questions.

Simulation, maintenance, system of preventative maintenance, number of personnel.

D.N. Subarev

QUESTIONS OF OPERATIONAL CONTROLLING SUBMERSIBLE RIGS OF «ELECTRIC CENTRIFUGAL PUMP — WELL» SYSTEM IN CASE OF NOT EFFICIENT BEDS

Subject to consideration being factors complicating oil production process under using electric centrifugal pumps in case of non efficient beds. In particular, the article considers processes of degassing water oil emulsion and lifting of mechanical impurities on operating elements of the pump. The author gives a review of basic methods of struggling against negative effect of these factors.

Well, electric centrifugal pump, productivity, gas factor, mechanical impurities, watering.

D.V. Morgunov, V.A. Ivanov

INVESTIGATION OF INTERACTION MECHANISM BETWEEN MAGNETIC FIELD AND LAYERED MEDIUM UNDER INSULATED COATING OF OIL AND GAS PIPELINES

The article gives a review of investigations conducted by the authors in the field of developing nano-composite polymer insulated coatings for oil and gas pipelines, and promising method of noncontact insulated coating of oil and gas pipelines using magnetic field. Subject to identification being basic parameters of the obtained insulated coating, stating direction of further investigations.

Insulated, composite material, polymer, technology, coating, magnetic field.

I.G. Solovyov

CONTROL AND MANAGEMENT OF WELL SYSTEM HYDRODYNAMICS IN NONSTATIONALRY MEDIUMS

The article gives formal justification of management tasks regarding well with submersible electric pump under nonstationary complicating operational factors. Criteria of optimum management specify a compromise between summary well productivity and thrifty consumption of submersible equipment resource. Three-leveled structure of management system reflects different rate dynamics regarding effect of complicating factors and a corresponding reaction of management algorithms for cleaning hydraulic path from paraffin and salt sediments, selection of unit's dimension type, and recovery of parameters of falling inflow.

Well, model, intelligent control, algorithm, drift of factors, hydrothermal dynamics, productivity, inflow.

Information technologies

V.R. Tsibulsky, O.S. Shaidurov

REVIEW OF INTERACTION MODELS BETWEEN ELECTROMAGNETIC FIELDS AND BLOOD FLOW IN HUMAN BLOOD VESSELS

The article describes basic models of blood flow in blood vessel, considering forces affecting process of blood circulation, and influence of electromagnetic fields on blood microcirculation. The article also suggests hypothesis on origin of electromagnetic induction and self-induction in blood vessel, as well as electromotive force affecting blood flow.

Blood microcirculation, electromagnetic field, blood flow, magnetic field, influence, flow, blood, myocytes, blood vessels, hydrodynamics.

S.V. Koinov

HIDDEN STRATEGIES: REVIEW OF SCIENTIFIC SCHOOLS, CLASSIFICATION AND PROBLEMS

The article gives a review of instruments detecting hidden strategies, considering approaches to identification and classification, touching upon problems of strategic management on level of companies and regions.

Hidden strategies; strategic, regional, corporative management; identification, classification, virtual models, matrix approach, strategic patterns.

A.V. Lubanenko

VIRTUAL STRATEGY OF COMPLEX STRUCTURED SUBJECT OF RUSSIAN FEDERATION ILLUSTRATED BY TYUMEN OBLAST

The article considers a variant of modeling virtual economy in Tyumen Oblast as a system of virtual enterprises and companies. One of the instruments of developing the latter was suggested through creating virtual development strategy. The article considers its basic notions and definitions.

Virtual strategy, region, economy.

A.A. Kresov, V.V. Uvarov

PRINCIPLES OF DATA INTEGRATION IN SUBSOIL MANAGEMENT

The article analyzes three basic approaches to integration of heterogeneous information resources: consolidation, federalization, dissemination, suggesting principles underlying development of data integration system in subsoil management.

Subsoil management, data, integration, consolidation, federalization, dissemination, storage, data adjustment, ETL, EII, SOA.

S.N. Sokolko, B.V. Semyonov

CERTAIN FEATURES REGARDING PROCESSING OF EXPERIMENTAL DATA WITH AUTOMATED SYSTEM FOR MODELING PROCESSES OF SELF-PROPAGATING HIGH TEMPERATURE SYNTHESIS

The article is devoted to questions of creating automated system for modeling SHS-processes, and interaction of certain elements of the system under solution of tasks set by the user. The authors consider principles of the system's division into subsystems and modules, as well as features of software support for separate modules.

Self-propagating high temperature synthesis (SHS), scientific research, automation, ROOT, QT.

S.A. Okhotnikov, G.P. Bystrai

ENTROPY PRODUCTION FOR SARCOMERE — SOLUTION SYSTEM IN THE PRESENCE OF ATP UNDER SELF-EXCITATION

Within a broad range of initial concentrations, subject to calculation being temporary change in entropy production for sarcomere — solution system in the presence of ATP (adenosine triphosphate) under self-excitation. Within methods of nonlinear dynamics, they calculated the following properties of chaotic pulsations: Lyapunov exponents, forgetfulness time of initial conditions, ranges of pulsations, and pseudo-phase plane portraits.

Sarcomere — solution, self-excitation, entropy, stability, calculation.

V.L. Yakushev, Yu.N. Zhuk, V.N. Simbirkin, A.V. Filimonov

IMPLEMENTATION OF CALCULATION METHODS FOR MAJOR TASKS IN STRUCTURAL MECHANICS USING STARK ES SOFTWARE

The article presents experience of implementing and using method of subconstructions and multifrontal method for solving systems of linear equations, as well as method of subspace iteration and block Lanczos algorithm with shifts for solution of eigenvalue problems using STARK ES software. The authors quote data on efficiency of using these methods in stark es software, illustrated by models of real building objects.

Finite element method, method of subconstructions, multifrontal method, subspace iteration method, Lanczos algorithm.

V.A. Shaptsev

INFORMATION AND INFORMATION TECHNOLOGY. TOPICAL STANDPOINT

The article considers a notion of information as a potential reflecting material world, and information process as combination of stages in signals' perception, their interpretation and use of interpretation result. Subject to justification being the following thesis: modern information technologies (IT) mainly deal with data, and not with information. Data remains information carrier. It is man who is busy obtaining information therefrom, and preparing decisions based on the obtained information. This accent actualizes demands to competence of IT user, on the one hand, and intensification of IT intellectualization, on the other hand.

Information, signals, data, interpretation, information process, technology, timely and adequate decisions.