



CONTROL SCIENCES

**Научно-технический
журнал**

6 номеров в год

ISSN 1819-3161

УЧРЕДИТЕЛЬ

**Институт проблем управления
им. В.А. Трапезникова РАН**

Главный редактор

И.В. Прангишвили

**Заместители главного
редактора**

Л.П. Боровских, Ф.Ф. Пащенко

Выпускающий редактор

Л.В. Петракова

**Издатель
ООО «СенСидат-Контрол»**

Ген. директор Н.Н. Кузнецова

Адрес редакции
117997, ГСП-7, Москва,
ул. Профсоюзная, д. 65, к. 104.
Тел./факс (495) 330-42-66,
тел. (495) 334-92-00

E-mail: datchik@ipu.ru
www.ipu.ru/period/ru

Оригинал-макет
и электронная версия
подготовлены
ООО «ЭЛЕКТРОНИФОРМ»

Отпечатано с готовых диапозитивов
в типографии ГКС

Подписано в печать
18.04.2006 г.

Заказ № РВ206

Журнал зарегистрирован
в Министерстве
Российской Федерации
по делам печати,
телерадиовещания
и средств массовых
коммуникаций

Свидетельство о регистрации
ПИ №77-11963
от 06 марта 2002 г.

Журнал входит в Перечень ВАК
(Бюл. ВАК. — 2004. — № 3)

Подписные индексы:
81708 в каталоге Роспечати
38006 в объединенном каталоге
«Пресса России»

© СенСидат-Контрол, 2006 г.

ПРОБЛЕМЫ УПРАВЛЕНИЯ

2.2006

СОДЕРЖАНИЕ

АВТОМАТИЗИРОВАННЫЕ СИСТЕМЫ МАССОВОГО ОБСЛУЖИВАНИЯ (тематическая подборка статей)

Вступление	2
Жожикашвили В. А., Петухова Н. В., Фархадов М. П. Компьютерные системы массового обслуживания и речевые технологии	3
Билик Р. В., Вертиб В. А., Гуденко А. А. Методология автоматизированных систем массового обслуживания – база современной сетевой экономики	8
Миллер А. М., Готтельф Г. П., Левин М. А., Ловский В. Ю. Система резерви- рования авиабилетов “Сирена-2.3”	13
Печерский М. П., Лившиц Б. Ю. Общегородская АСУ дорожным движением в Москве (система “Старт”) и ее дальнейшее развитие	20
Саакян В. Г., Левин М. А., Ловский В. Ю., Миллер А. М. Автоматизированная система продажи автобусных перевозок “Автовокзал-2”	26
Колотников А. В., Мысоедова З. П. Применение языка Simscript для описания систем массового обслуживания	29
Жожикашвили В. А., Петухова Н. В. Современные технологии управления в диспетчерской службе такси	32
Билик Р. В., Мысоедова З. П., Неснова Н. Н., Шпанов С. Н. Электронные платежные системы и речевые технологии	35
Фархадов М. П., Жожикашвили А. В. Математическая модель для расчета среднего числа переспросов при компьютерном распознавании речи	38

Анализ и синтез систем управления

Жираобок А. Н. Аналог ганкелевой матрицы для нелинейной динамической системы	42
Стукач О. В. Сигнально-параметрическая инвариантность систем управления	47

Информационные технологии в управлении

Подлазов В. С. Наращиваемые многокольцевые некоммутируемые сети связи для многопроцессорных вычислительных систем	50
Грибова В. В., Клещев А. С. Управление проектированием и реализацией пользовательского интерфейса на основе онтологий	58

Моделирование систем

Бунич А. Л. Системы управления с идентификатором. Ч. II	63
Соколов С. В., Погорелов В. А. Решение задачи идентификации структуры стохастического процесса	70

Управление подвижными объектами

Касимов А. М., Мамедли Э. М., Чернявский Л. Т. и др. Обеспечение точности и непрерывности управления летательным аппаратом в условиях действия дестабилизирующих факторов	75
---	----

Управление в социально-экономических системах

Санникова И. Н. Информационная поддержка обучающейся организации	81
Крупорницкая И. А. Совершенствование управления экспортной стратегией компании “Газпром”	87
Карибский А. В., Мишутин Д. Ю., Шишорин Ю. Р. Методы моделирования процесса бюджетирования в интегрированных компаниях	92

* * *

Ивери Варламович Прангишвили	97
Contents and abstracts	99



CONTENTS & ABSTRACTS

AUTOMATED QUEUING AND SERVICE SYSTEMS: A THEMATIC COLLECTION

COMPUTERIZED QUEUING SYSTEMS
AND SPEECH TECHNOLOGIES 3

Zhozhikashvili V. A., Petukhova N. V., Farkhadov M. P.

The paper reviews current state and development trends of computerized queuing systems and speech technologies. Despite scientific advances of speech technologies, computer speech recognition have not yet achieved the level typical for human individuals. The paper shows that at the current recognition level, stable and effective operation of the systems with speech recognition can be attained by means of interface adjustment and dialogue management. The approaches to performance improvement of service systems with speech recognition with the help of algorithmic techniques are discussed.

THE METHODOLOGY OF AUTOMATED SERVICE
SYSTEMS – THE BASIS FOR MODERN NETWORK
ECONOMY 8

Bilik R. V., Vertlib V. A., Gudenko A. A.

The problems of development and dissemination of modern electronic applications operating in network environment are discussed. Their structural similarity to automated service systems is shown. The technology of "electronic commerce" in the Internet environment can be considered as the current development stage of automated service systems.

SIRENA-2.3 COMPUTER-BASED RESERVATION
SYSTEM 13

Miller A. M., Gotgelf G. P., Levin M. A., Lovsky V. Yu.

The paper describes Sirena-2.3 computer-based reservation system that replaced the earlier system Sirena-2 working as long as since 1972. The solutions, applied in Sirena-2.3 enabled considerable functionality enhancement, provided a new level of resource management and opened the access to resources through a maximum number of distribution channels.

THE MOSCOW TRAFFIC MANAGEMENT SYSTEM
(THE START SYSTEM) AND ITS FURTHER
EVOLUTION 20

Pechersky M. P., Livshits B. Yu.

The paper describes the automated system realizing traffic signals coordination, traffic management in special and extreme situations, video surveillance and video recording, automatic traffic monitoring, traveler information, and traffic management in Lefortovo tunnel complex.

AUTOVOKZAL-2 BUS CONVEYANCE SALES
SYSTEM 26

Saakian V. G., Levin M. A., Lovsky V. Yu., Miller A. M.

The paper describes Autovokzal-2 (Bus Station-2) system – the enhancement of the 1st Russian bus conveyance sales system. The approaches to system design are expounded, its functional, engineering, and technical features are described. In addition to its direct functions, the system became a framework for building a control loop of all commercial activities of conveyance business participants.

SIMSCRIPT SIMULATION LANGUAGE
APPLICATION FOR QUEUING SYSTEMS
DESCRIPTION 29

Kolotnikov A. V., Myasoyedova Z. P.

The features of Simscript simulation language are discussed, its development tools and the approaches to queuing systems analysis are described. A simulation model example is included.

TIME CONTROL TECHNOLOGIES
IN TAXI DISPATCHING CENTER 32

**Zhozhikashvili V. A., Petukhova N. V., Zatsepin A. N.,
Azarov V. V.**

The paper discusses work organization of taxi dispatching centre with the help of state-of-the-art technologies such as GPS, speech recognition technology, electronic payment systems, etc.

ELECTRONIC PAYMENT SYSTEMS AND SPEECH
RECOGNITION TECHNOLOGIES 35

**Bilik R. V., Myasoyedova Z. P., Nesnova N. N.,
Shpanov S. N.**

Modern electronic payment systems currently available from the Russian Internet are reviewed, their functions and services are presented. The application of computerized speech technologies for internet money transfers are described by the example of Telepath service of WebMoney payment system.

MATHEMATICAL MODEL FOR CALCULATING
THE AVERAGE NUMBER OF RETRIES
IN A SPEECH RECOGNITION DIALOGUE 38

Farkhadov M. P., Zhozhikashvili A. V.

The paper presents a mathematical model for calculating the average number of retries in a speech recognition dialogue. Two algorithms of computer behavior are described and compared.

AN ANALOG OF HANKEL MATRIX
FOR A NONLINEAR DYNAMIC SYSTEM 42**Zhirabok A. N.**

A method of Hankel matrix analog design for a nonlinear discrete dynamic system is offered on the basis of the analogs of observability and controllability matrices.

SIGNAL-PARAMETRIC INVARIANCE
OF CONTROL SYSTEMS 47**Stukach O. V.**

A new definition of signal-parametric invariance of a nonlinear system is offered. The conditions of invariance of system's response parameters to the source signal's amplitude are determined. The connection between classical and parametric invariance is established. The equations for invariance defect evaluation are derived, and the ways to decrease it are considered. A possibility of control system optimization with respect to the signal-parametric invariance criterion is discussed.

SCALABLE MULTIRING FIXED PLANTS
FOR MULTI-PROCESSOR COMPUTATION
SYSTEMS 50**Podlazov V. S.**

A concept of scalable multiring communications network whose throughput can be directly proportional to the number of network nodes at low ring count is offered.

THE MANAGEMENT OF USER INTERFACE
DESIGN AND IMPLEMENTATION
ON THE BASIS OF ONTOLOGIES 58**Gribova V. V., Kleshchev A. S.**

A new approach allowing for software systems development requirements and based on the analysis of modern user interface development toolkits is offered. The approach's message is to create the information needed for the design and implementation of a specific user interface based on the ontologies describing each component of the user interface, with the subsequent automatic generation of the interface's executable code based on this high-level specification.

CONTROL SYSTEMS WITH IDENTIFIER.
PART II 63**Bunich A. L.**

The problems of plant identification during its normal operation and the problem of main control loop synthesis for a control system are discussed. The focus is made on the problem of maximum permissible transient speed in the identifier and the maximum attainable control accuracy in the problem of main control loop synthesis when a priori information about external disturbances is available.

IDENTIFICATION OF STOCHASTIC PROCESS
STRUCTURE 70**Sokolov S. V., Pogorelov V. A.**

A solution to the identification problem for the current structure of a nonlinear multi-structural stochastic process in the course of nonlinear measurements of its state vector is proposed. The feasibility of the practical realization of the approach suggested is analyzed, and a numerical example illustrating its efficiency is adduced.

ENSURING AIRCRAFT CONTROL ACCURACY
AND CONTINUITY UNDER EXTERNAL
PERTURBATIONS 75**Kasimov A. M., Mamedli E. M., Chernyavsky L. T., et al.**

A possibility of utilizing information flows inherent in the combined control system for solving the problem of aircraft control accuracy improvement and continuity provision under external perturbations is discussed.

INFORMATION SUPPORT FOR A LEARNING
ORGANIZATION 81**Sannikova I. N.**

Personnel training process is examined as a beginning of the realization of any organization's strategy. The process cannot be discrete because strategic directives in the modern world are a subject to permanent updating. The paper analyzes the elements of a learning organization, concludes about the insufficiency of the traditional approach to the monitoring of learning processes, and offers a new concept of organizational changes monitoring.

GAZPROM JSC MANAGEMENT
IMPROVEMENT 87**Krupornitskaya I. A.**

The paper discusses the export gas deliveries market and the possibility of gas industry management improvement under the conditions of foreign-economic activities liberalization.

BUDGETING MODELING METHODS
FOR INTEGRATED COMPANIES 92**Karibsky A. V., Mishutin D. Yu., Shishorin Yu.R.**

The essence of finance and economic simulation modeling for the budget planning of integrated companies are discussed as well as the basic concepts of budgeting simulation models development for various aggregation levels (head office, subsidiary, the whole company). The algorithms of raw data acquisition and conversion are described.

IVERI V. PRANGISHVILI 97