# ИНФОРМАЦИЯ ДЛЯ АВТОРОВ И ПОДПИСЧИКОВ

Вниманию авторов!

Представляем для ознакомления титульный лист и оборот титула англоязычного издания нашего журнала.

Стоимость годовой подписки в США — \$2945.00.

**VOLUME 50, ISSUE 8** 

2018

# JOURNAL OF AUTOMATION AND INFORMATION SCIENCES

Международный научно-технический журнал ПРОБЛЕМЫ УПРАВЛЕНИЯ И ИНФОРМАТИКИ

Mezhdunarodnyi nauchno-tekhnicheskiy zhurnal PROBLEMY UPRAVLENIYA I INFORMATIKI Translated from Russian

> EDITOR-IN-CHIEF VSEVOLOD M. KUNTSEVICH



Международный научно-технический журнал «Проблемы управления и информатики», 2019, № 3

### Aims AND Scope

Journal of Automation and Information Sciences (JAI) consists of translations of papers from the Russianlanguage bimonthly «Mezhdunarodnyi nauchno-tekhnicheskiy zhurnal «Problemy upravleniya i informatiki» (ISSN 0572-2691). The Journal of Automation and Information Sciences is published under an exclusive license to Begell House, Inc., in full compliance with the International Copyright Convention. Subjects covered in JAI include (but are not limited to) space information technology and systems research, information sciences (pattern recognition, forecasting, identification and evaluation of complex systems, information security, fault diagnosis and reliability) and automation (adaptive, stochastic and optimal control, control and identification under uncertainty, robotics, and applications of user-friendly computers in management of economic, industrial, biological and medical systems).

#### Editor-in-Chief Vsevolod M. Kuntsevich

Institute of Space Research

National Academy of Sciences of Ukraine and State Space Agency of Ukraine 40 Akadem. Glushkov Ave., Building 4/1, Kiev, 03187, Ukraine

#### Associate Editors Nonna V. Turovyerova and Arkadiy A. Chikrii

V.M. Glushkov Institute of Cybernetics National Academy of Sciences of Ukraine 40 Akadem. Glushkov Ave., Kiev, 03187, Ukraine

## **Editorial Board**

V.M.Belov	I.V. Sergienko	V.B. Larin
A.N. Khimich	R.M. Yusupov	R.Ortega
V.F. Gubarev	I.M. Cherevko	S.N. Vasilyev
N.Yu. Kuznetsov	F.G. Garashchenko	M.Z. Zgurovsky
B. Mordukhovich	P. Ioannou	

*Journal of Automation and Information Sciences* (ISSN 1064-2315) is published twelve times a year and owned by Begell House, Inc., 50 North Street, Danbury, CT 06810, telephone (203) 456-6161. USA subscription rate for 2018 is **\$2945.00**. Add \$10.00 per issue for foreign airmail shipping and handling fees to all orders shipped outside the United States or Canada. Subscriptions are payable in advance. Subscriptions are entered on an annual basis. i.e., January to December. For immediate service and charge card sales, call (203) 456-6161 Monday through Friday 9 AM-5 PM EST. Fax orders to (203) 456-6167. Send written orders to Subscriptions Department, Begell House, Inc., 50 North Street, Danbury, CT 06810. You can also visit our website at <a href="http://www.begellhouse.com/">http://www.begellhouse.com/</a> or <a href="http://www.dLbegellhouse.com/">http://www.dLbegellhouse.com/</a>.

This journal contains information from authentic and highly regarded sources. Reprinted material is quoted with permission, and sources are indicated. A wide variety of references is listed. Reasonable efforts have been made to publish reliable data and information, but the editor and the publisher assume no responsibility for any statements of fact or opinion expressed in the published papers or in the advertisements.

Copyright © 2018 by Begell House, Inc. All rights reserved. Printed in the United States of America. Authorization to photocopy items for internal or personal use, or the internal or personal use of specific clients. is granted by Begell House, Inc., for libraries and other users registered with the Copyright Clearance Center (CCC) Transactional Reporting Service, provided that the base fee of \$35.00 per copy, plus .00 per page, is paid directly to CCC, 27 Congress St., Salem, MA 01970, USA. For those organizations that have been granted a photocopy license by CCC, a separate payment system has been arranged. The fee code for users of the Transactional Reporting Service is: [ISSN 1064-2315/18/ \$35.00+\$0.00). The fee is subject to change without notice.

Begell House, Inc.'s, consent does not extend to copying for general distribution, for promotion, for creating new works, or for resale. Specific permission must be obtained from Begell House, Inc., for such copying.

## Journal of Automation and Information Sciences is covered in EBSCO, Scopus, and INSPEC.

#### Printed October 24, 2018