



I T H E A



International Journal

INFORMATION

**CONTENT
&
PROCESSING**



2018 **Volume 5** **Number 3**



**International Journal
INFORMATION CONTENT & PROCESSING
Volume 5 / 2018, Number 3**

EDITORIAL BOARD

Editor in chief: **Krassimir Markov** (Bulgaria)

Abdel-Badeeh M. Salem (Egypt)	Gurgen Khachatryan (Armenia)	Oleksandr Stryzhak (Ukraine)
Abdelmgeid Amin Ali (Egypt)	Hasmik Sahakyan (Armenia)	Olena Chebanyuk (Ukraine)
Albert Voronin (Ukraine)	Irina Artemieva (Russia)	Oleksandr Trofymchuk (Ukraine)
Alexander Eremeev (Russia)	Yurii Krak (Ukraine)	Orly Yadid-Pecht (Israel)
Alexander Palagin (Ukraine)	Elguja Meqvabishvili (Georgia)	Pedro Marijuan (Spain)
Alexey Petrovskiy (Russia)	Juan Castellanos (Spain)	Rafael Yusupov (Russia)
Alexey Voloshin (Ukraine)	Koen Vanhoof (Belgium)	Sergey Krivii (Ukraine)
Alfredo Milani (Italy)	Krassimira B. Ivanova (Bulgaria)	Tatyana Gavrilova (Russia)
Anatoliy Gupal (Ukraine)	Levon Aslanyan (Armenia)	Vadim Vagin (Russia)
Anatoliy Krissilov (Ukraine)	Luis Fernando de Mingo (Spain)	Valeria Gribova (Russia)
Arnold Sterenharz (Germany)	Liudmila Cheremisinova (Belarus)	Vasil Sgurev (Bulgaria)
Benoa Depaire (Belgium)	Lyudmila Lyadova (Russia)	Vitalii Velychko (Ukraine)
Diana Bogdanova (Russia)	Mark Burgin (USA)	Vitaliy Snituk (Ukraine)
Dmitro Buy (Ukraine)	Martin P. Mintchev (Canada)	Vladimir Jotsov (Bulgaria)
Elena Zamyatina (Russia)	Mikhail Alexandrov (Russia)	Vladimir Ryazanov (Russia)
Ekaterina Solovyova (Ukraine)	Nadiia Volkovych (Ukraine)	Vladimir Shirokov (Ukraine)
Evgeniy Bodyansky (Ukraine)	Nataliia Kussul (Ukraine)	Xenia Naidenova (Russia)
Galyna Gayvoronska (Ukraine)	Natalia Ivanova (Russia)	Yuriy Zaichenko (Ukraine)
Galina Setlac (Poland)	Natalia Pankratova (Ukraine)	Yurii Zhuravlev (Russia)
Gordana Dodig Crnkovic (Sweden)	Olga Nevzorova (Russia)	Zurab Munjishvili (Georgia)

**IJ ICP is official publisher of the scientific papers of the members of the ITHEA®
International Scientific Society**

IJ ICP rules for preparing the manuscripts are compulsory.
The **rules for the papers** for ITHEA International Journals as well as the **subscription fees** are
given on www.ithea.org .

The papers should be submitted by ITHEA® Submission system <http://ij.ithea.org> .
Responsibility for papers published in IJ IMA belongs to authors.

International Journal "INFORMATION CONTENT AND PROCESSING" Volume 5, Number 3, 2018

Edited by the **Institute of Information Theories and Applications FOI ITHEA**, Bulgaria,
in collaboration with: University of Telecommunications and Posts, Bulgaria,
V.M.Glushkov Institute of Cybernetics of NAS, Ukraine, Universidad Politécnica de Madrid, Spain,
Hasselt University, Belgium, University of Perugia, Italy,
Institute for Informatics and Automation Problems, NAS of the Republic of Armenia
St. Petersburg Institute of Informatics, RAS, Russia,

Publisher: **ITHEA®** Sofia, 1000, P.O.B. 775, Bulgaria. www.ithea.org , e-mail: office@ithea.org

Technical editor: **Ina Markova**

Printed in Bulgaria

Copyright © 2018 All rights reserved for the publisher and all authors.

© 2014 – 2018 "Information Content and Processing" is a trademark of ITHEA®

© ITHEA is a registered trade mark of FOI-Commerce Co.

ISSN 2367-5128 (printed)

ISSN 2367-5152 (online)