



**I T H E A**



**International Journal**

**INFORMATION THEORIES  
&  
APPLICATIONS**



**2016 Volume 23 Number 2**



**International Journal**  
**INFORMATION THEORIES & APPLICATIONS**  
Volume 23 / 2016, Number 2

**Editorial board**

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

<b>Alberto Arteta</b>	(Spain)	<b>Luis F. de Mingo</b>	(Spain)
<b>Aleksey Voloshin</b>	(Ukraine)	<b>Lyudmila Lyadova</b>	(Russia)
<b>Alexander Eremeev</b>	(Russia)	<b>Martin P. Mintchev</b>	(Canada)
<b>Alexander Kleshchev</b>	(Russia)	<b>Natalia Bilous</b>	(Ukraine)
<b>Alexander Palagin</b>	(Ukraine)	<b>Natalia Pankratova</b>	(Ukraine)
<b>Alfredo Milani</b>	(Italy)	<b>Rumyana Kirkova</b>	(Bulgaria)
<b>Avram Eskenazi</b>	(Bulgaria)	<b>Stoyan Poryazov</b>	(Bulgaria)
<b>Boris Fedunov</b>	(Russia)	<b>Tatyana Gavrilova</b>	(Russia)
<b>Constantine Gaidric</b>	(Moldavia)	<b>Tea Munjishvili</b>	(Georgia)
<b>Galina Rybina</b>	(Russia)	<b>Valeriya Gribova</b>	(Russia)
<b>Hasmik Sahakyan</b>	(Armenia)	<b>Vasil Sgurev</b>	(Bulgaria)
<b>Ilia Mitov</b>	(Bulgaria)	<b>Vitalii Velychko</b>	(Ukraine)
<b>Juan Castellanos</b>	(Spain)	<b>Vitaliy Lozovskiy</b>	(Ukraine)
<b>Koen Vanhoof</b>	(Belgium)	<b>Vladimir Donchenko</b>	(Ukraine)
<b>Krassimira B. Ivanova</b>	(Bulgaria)	<b>Vladimir Jotsov</b>	(Bulgaria)
<b>Leonid Hulianytskyi</b>	(Ukraine)	<b>Vladimir Ryazanov</b>	(Russia)
<b>Levon Aslanyan</b>	(Armenia)	<b>Yevgeniy Bodyanskiy</b>	(Ukraine)

International Journal "INFORMATION THEORIES & APPLICATIONS" (IJ ITA)  
is official publisher of the scientific papers of the members of  
the **ITHEA International Scientific Society**

IJ ITA welcomes scientific papers connected with any information theory or its application.

IJ ITA rules for preparing the manuscripts are compulsory.

The **rules for the papers** for IJ ITA are given on [www.ithea.org](http://www.ithea.org).

Responsibility for papers published in IJ ITA belongs to authors.

**International Journal "INFORMATION THEORIES & APPLICATIONS" Vol. 23, Number 2, 2016**

Edited by the **Institute of Information Theories and Applications FOI ITHEA**, Bulgaria, in collaboration with:

Institute of Mathematics and Informatics, BAS, Bulgaria,

V.M.Glushkov Institute of Cybernetics of NAS, Ukraine,

Universidad Politécnica de Madrid, Spain,

Hasselt University, Belgium,

St. Petersburg Institute of Informatics, RAS, Russia,

Institute for Informatics and Automation Problems, NAS of the Republic of Armenia

**Printed in Bulgaria**

**Publisher ITHEA®**

Sofia, 1000, P.O.B. 775, Bulgaria. [www.ithea.org](http://www.ithea.org), e-mail: [info@foibg.com](mailto:info@foibg.com)

Technical editor: **Ina Markova**

**Copyright © 2016 All rights reserved for the publisher and all authors.**

© 1993-2016 "Information Theories and Applications" is a trademark of ITHEA®

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

**ISSN 1310-0513 (printed)**

**ISSN 1313-0463 (online)**