



I T H E A



International Journal
INFORMATION THEORIES
&
APPLICATIONS



2017 Volume **24** Number **4**



International Journal
INFORMATION THEORIES & APPLICATIONS
Volume 24 / 2017, Number 4

Editorial board

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

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

Responsibility for papers published in IJ ITA belongs to authors.

International Journal "INFORMATION THEORIES & APPLICATIONS" Vol. 24, Number 4, 2017

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

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,

Printed in Bulgaria

Publisher ITHEA®

Sofia, 1000, P.O.B. 775, Bulgaria. www.ithea.org, e-mail: info@foibg.com

Technical editor: Ina Markova

Copyright © 2017 All rights reserved for the publisher and all authors.

© 1993-2017 "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)