

I T H E A

International Journal
MODELS
INFORMATION **&**
ANALYSES

2018 **Volume 7** **Number 1**

**International Journal
INFORMATION MODELS AND ANALYSES
Volume 7 / 2018, Number 1**

EDITORIAL BOARD

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

Alberto Arteta (Spain)	Luis Fernando de Mingo (Spain)
Albert Voronin (Ukraine)	Liudmila Cheremisinova (Belarus)
Aleksey Voloshin (Ukraine)	Lyudmila Lyadova (Russia)
Alexander Palagin (Ukraine)	Martin P. Mintchev (Canada)
Alexey Petrovskiy (Russia)	Natalia Kussul (Ukraine)
Alfredo Milani (Italy)	Natalia Ivanova (Russia)
Anatoliy Krissilov (Ukraine)	Natalia Pankratova (Ukraine)
Avram Eskenazi (Bulgaria)	Nelly Maneva (Bulgaria)
Boris Tsankov (Bulgaria)	Nugzar Todua (Georgia)
Boris Sokolov (Russia)	Olena Chebanyuk (Ukraine)
Diana Bogdanova (Russia)	Olga Nevzorova (Russia)
Ekaterina Solovyova (Ukraine)	Orly Yadid-Pecht (Israel)
Evgeniy Bodyansky (Ukraine)	Pedro Marijuan (Spain)
Galya Gayvoronska (Ukraine)	Rafael Yusupov (Russia)
Galina Setlac (Poland)	Sergey Kryvyy (Ukraine)
George Totkov (Bulgaria)	Stoyan Poryazov (Bulgaria)
Gurgen Khachatryan (Armenia)	Tatyana Gavrilova (Russia)
Hasmik Sahakyan (Armenia)	Tea Munjishvili (Georgia)
Iliia Mitov (Bulgaria)	Valeria Gribova (Russia)
Juan Castellanos (Spain)	Vasil Sgurev (Bulgaria)
Koen Vanhoof (Belgium)	Vitalii Velychko (Ukraine)
Krassimira B. Ivanova (Bulgaria)	Vladimir Ryazanov (Russia)
Leonid Hulianytskyi (Ukraine)	Yordan Tabov (Bulgaria)
Levon Aslanyan (Armenia)	Yuriy Zaichenko (Ukraine)

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

IJ IMA rules for preparing the manuscripts are compulsory.

The rules for the papers for ITHEA International Journals are given on www.ithea.org.

The camera-ready copy of the paper should be received by ITHEA® Submission system <http://ij.ithea.org>.

Responsibility for papers published in IJ IMA belongs to authors.

International Journal "INFORMATION MODELS AND ANALYSES" Volume 7, Number 1, 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.

© 2012-2018 "Information Models and Analyses" is a trademark of ITHEA®

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

ISSN 1314-6416 (printed)

ISSN 1314-6432 (Online)