

# DISCRETE MATHEMATICS AND APPLICATIONS

## EDITOR-IN-CHIEF

*Andrei M. Zubkov, Moscow*

## EDITORIAL BOARD

*Valery B. Alekseev, Moscow*

*Vladimir N. Chubarikov, Moscow*

*Yuri L. Ershov, Novosibirsk*

*Mikhail M. Glukhov, Moscow*

*Alexander A. Grusho, Moscow*

*Grigory I. Ivchenko, Moscow*

*Oktai M. Kasim-Zade, Moscow*

*Valentin F. Kolchin, Moscow*

*Valery B. Kudryavtsev, Moscow*

*Yuri I. Medvedev, Moscow*

*Vladimir G. Mikhailov, Moscow*

*Boris A. Pogorelov, Moscow*

*Eduard A. Primenko, Moscow*

*Vladimir N. Sachkov, Moscow*

*Vladimir A. Vatutin, Moscow*

*Yuri I. Zhuravlev, Moscow*

## ADVISORY BOARD

*Vladimir A. Emelichev, Minsk*

*Igor N. Kovalenko, Kiev*

*Yuri I. Matiyasevich, St. Petersburg*

*Lev Ya. Savelyev, Novosibirsk*

*Sergei A. Stepanov, Moscow*

*Yuri I. Yanov, Moscow*

**DE GRUYTER**

**DISCRETE MATHEMATICS AND APPLICATIONS** provides the latest information on the development of discrete mathematics in Russia to a world-wide readership. The journal contains papers from the Russian-language journal *Diskretnaya Matematika*, the only journal of the Russian Academy of Sciences devoted to this field of mathematics. *Discrete Mathematics and Applications* covers various subjects in the fields such as combinatorial analysis, graph theory, functional systems theory, cryptology, coding, probabilistic problems of discrete mathematics, algorithms and their complexity, combinatorial and computational problems of number theory and of algebra. The journal is published bimonthly, simultaneously with the Russian edition as a cover-to-cover translation. Issues contain, in addition to original articles and reviews in the above-mentioned subject areas, reviews of books published in and outside Russia and information notes.

All information regarding subscriptions, Open access, back volumes and orders is available online at [www.degruyter.com/dma](http://www.degruyter.com/dma).

**ABSTRACTED/INDEXED IN** Celdes · CNKI Scholar (China National Knowledge Infrastructure) · CNPIEC · EBSCO: Academic Search; Advanced Placement Source; Applied Science & Technology Source; Computers & Applied Sciences Complete; Engineering Source; MegaFILE; Military & Government Collection; Science & Technology Collection; TOC Premier; Discovery Service · Elsevier: Compendex; Engineering Village; SCOPUS · Gale/Cengage - Academic One File · Google Scholar · J-Gate · Mathematical Reviews (MathSciNet) · Naviga (Softweco) · Primo Central (ExLibris) · ProQuest: Deep Indexing: Computing; Deep Indexing: Math & Statistics; Deep Indexing: Science Journals; Engineering Research Database; High Tech Research Database; Illustrata: Natural Sciences; Illustrata: Technology; Technology Research Database · SCImago (SJR) · Summon (Serials Solutions/ProQuest) · TDOne (TDNet) · Ulrich's Periodicals Directory/ulrichsweb · WorldCat (OCLC) · Zentralblatt Math

ISSN 0924-9265 · e-ISSN 1569-3929 · CODEN DMAPEW

**RESPONSIBLE EDITOR** Alexander A. Serov, Steklov Mathematical Institute, Russian Academy of Sciences,  
Gubkina str. 8, 119991, Moscow, Russia.  
Email: [serov@mi.ras.ru](mailto:serov@mi.ras.ru)

**JOURNAL MANAGER** Theresa Haney, De Gruyter, Genthiner Straße 13, 10785 Berlin, Germany.  
Tel.: +49 (0)30 260 05-375, Fax: +49 (0)30 260 05-250  
Email: [theresa.haney@degruyter.com](mailto:theresa.haney@degruyter.com)

**RESPONSIBLE FOR ADVERTISEMENTS** Claudia Neumann, De Gruyter, Genthiner Straße 13, 10785 Berlin, Germany.  
Tel.: +49 (0)30 260 05-226, Fax: +49 (0)30 260 05-264  
Email: [anzeigen@degruyter.com](mailto:anzeigen@degruyter.com)

© 2016 Walter de Gruyter GmbH, Berlin/Boston

**PRINTING** Franz X. Stickle Druck und Verlag e.K., Ettenheim  
Printed in Germany



Offenlegung der Inhaber und Beteiligungsverhältnisse gem. § 7a Abs. 1 Ziff. 1, Abs. 2 Ziff. 3 des Berliner Pressegesetzes: Die Gesellschafter der Walter de Gruyter GmbH sind: Clara Cram Stiftung, Berlin; Cram, Gisela, Rentnerin, Berlin; Cram, Dr. Georg-Martin, Unternehmens-Systemberater, Stadtbergen; Cram, Maike, Berlin; Cram, Jens, Mannheim; Cram-Heydrich, Ingrid, Betriebsleiterin, Tuxpan / Michoacan (Mexiko); Cram-Heydrich, Sabina, Mexico DF (Mexiko); Cram, Silke, Wissenschaftlerin, Mexico DF (Mexiko); Cram, Björn, Aachen; Cram, Ella Anita, Rentnerin, Berlin; Cram, Berit, Greifswald; Cram-Gomez, Susanne, Mexico DF (Mexiko); Cram-Heydrich, Walter, Mexico DF (Mexiko); Cram-Heydrich, Kurt, Angestellter, Mexico DF (Mexiko); Duvenbeck, Brigitta, Oberstudienrätin i.R., Bad Homburg; Gädeke, Gudula, M.A., Atemtherapeutin/Lehrerin, Tübingen; Gädeke, Martin, Einzelunternehmer, Würzburg; Lubasch, Dr. Annette, Ärztin, Berlin; Schütz, Dr. Christa, Ärztin, Mannheim; Schütz, Sonja, Berlin; Schütz, Julianne, Berlin; Schütz, Antje, Berlin; Schütz, Valentin, Berlin; Seils, Dorothee, Apothekerin, Stuttgart; Seils, Gabriele, Journalistin, Berlin; Seils, Dr. Clara-Eugenie, Oberstudienrätin i.R., Reppenstedt; Seils, Christoph, Journalist, Berlin; Siebert, John-Walter, Pfarrer, Oberstenfeld; Walter de Gruyter Stiftung, Berlin.

## Contents

Georgiy I. Kalmykov

**Frame classification of the reduced labeled blocks — 1**

Yuriy S. Kharin and Egor V. Vecherko

**Detection of embeddings in binary Markov chains — 13**

Olga V. Podolskaya

**Circuit complexity of symmetric Boolean functions in antichain basis — 31**

Pavel V. Roldugin and Alexey V. Tarasov

**Functions without short implicents.**

**Part I: lower estimates of weights — 41**

Valentin A. Topchiy

**Two-dimensional renewal theorems with weak moment conditions and critical Bellman–Harris branching processes — 51**

