

# Transactions of the Moscow Mathematical Society

---

2009

---

*A Translation of*

ТРУДЫ  
МОСКОВСКОГО  
МАТЕМАТИЧЕСКОГО  
ОБЩЕСТВА

ТОМ 70 2009



---

American Mathematical Society

---

Providence, Rhode Island USA  
ISSN 0077-1554

# TRANSACTIONS OF THE MOSCOW MATHEMATICAL SOCIETY

Translation edited by Frances H. Goldman  
with the assistance of AMS staff

*A translation of*

ТРУДЫ МОСКОВСКОГО МАТЕМАТИЧЕСКОГО ОБЩЕСТВА

## Editorial Board

A. G. Sergeev (Editor in Chief)  
A. V. Domrin (Corresponding Secretary)  
È. B. Vinberg Yu. S. Il'yashenko A. A. Shkalikov

## Advisory Board

I. M. Gel'fand R. A. Minlos  
S. P. Novikov N. Kh. Rozov

Library of Congress Card Number 65-4713

**SUBSCRIPTION INFORMATION.** Transactions of the Moscow Mathematical Society for 2009 will consist of one issue. Beginning in 2004, *Transactions of the Moscow Mathematical Society* is accessible from [www.ams.org/journals/](http://www.ams.org/journals/). The subscription prices for 2009 are US\$509.00 list; US\$407.00 institutional member. Upon request, subscribers to paper delivery of this journal are also entitled to receive electronic delivery. For paper delivery, subscribers outside the United States and India must pay a postage surcharge of US\$6.00; subscribers in India must pay a postage surcharge of US\$13.00. Expedited delivery to destinations in North America US\$8.00; elsewhere US\$16.00.

**BACK NUMBER INFORMATION.** For back issues see [www.ams.org/bookstore](http://www.ams.org/bookstore).

Subscriptions and orders should be addressed to American Mathematical Society, P.O. Box 845904, Boston, MA 02284-5904, USA. *All orders must be accompanied by payment.* Other correspondence should be addressed to 201 Charles St., Providence, RI 02904-2294, USA.

**COPYING AND REPRINTING.** Material in this journal may be reproduced by any means for educational and scientific purposes without fee or permission with the exception of reproduction by services that collect fees for delivery of documents and provided that the customary acknowledgment of the source is given. This consent does not extend to other kinds of copying for general distribution, for advertising or promotional purposes, or for resale. Requests for permission for commercial use of material should be addressed to the Acquisitions Department, American Mathematical Society, 201 Charles St., Providence, Rhode Island 02904-2294, USA. Requests can also be made by e-mail to [reprint-permission@ams.org](mailto:reprint-permission@ams.org).

**Transactions of the Moscow Mathematical Society** (ISSN 0077-1554) is published by the American Mathematical Society, 201 Charles Street, Providence, RI 02904-2294, USA and is mailed from Providence, Rhode Island. Postmaster: Send address changes to Transactions of the Moscow Mathematical Society, American Mathematical Society, 201 Charles Street, Providence, RI 02904-2294, USA.

© 2009, American Mathematical Society. All rights reserved.

This journal is indexed in *Mathematical Reviews* and *Zentralblatt MATH*.

This journal is archived in *Portico*.

The London Mathematical Society is incorporated under Royal Charter and is registered with the Charity Commissioners.

Printed in the United States of America.

⊗ The paper used in this journal is acid-free and falls within the guidelines established to ensure permanence and durability.

10 9 8 7 6 5 4 3 2 1      14 13 12 11 10 09

Transactions of the  
**Moscow**  
**Mathematical**  
**Society**

---

2009

---

*A Translation of*

ТРУДЫ  
МОСКОВСКОГО  
МАТЕМАТИЧЕСКОГО  
ОБЩЕСТВА

ТОМ 70 2009

This translation was prepared jointly by  
the American Mathematical Society  
and the London Mathematical Society



---

American Mathematical Society

---

Providence, Rhode Island USA  
ISSN 0077-1554

# TRANSACTIONS OF THE MOSCOW MATHEMATICAL SOCIETY

Translation edited by Frances H. Goldman  
with the assistance of AMS staff

*A translation of*

ТРУДЫ МОСКОВСКОГО МАТЕМАТИЧЕСКОГО ОБЩЕСТВА

## Editorial Board

A. G. Sergeev (Editor in Chief)  
A. V. Domrin (Corresponding Secretary)  
È. B. Vinberg Yu. S. Il'yashenko A. A. Shkalikov

## Advisory Board

I. M. Gel'fand R. A. Minlos  
S. P. Novikov N. Kh. Rozov

Library of Congress Card Number 65-4713

**SUBSCRIPTION INFORMATION.** Transactions of the Moscow Mathematical Society for 2009 will consist of one issue. Beginning in 2004, *Transactions of the Moscow Mathematical Society* is accessible from [www.ams.org/journals/](http://www.ams.org/journals/). The subscription prices for 2009 are US\$509.00 list; US\$407.00 institutional member. Upon request, subscribers to paper delivery of this journal are also entitled to receive electronic delivery. For paper delivery, subscribers outside the United States and India must pay a postage surcharge of US\$6.00; subscribers in India must pay a postage surcharge of US\$13.00. Expedited delivery to destinations in North America US\$8.00; elsewhere US\$16.00.

**BACK NUMBER INFORMATION.** For back issues see [www.ams.org/bookstore](http://www.ams.org/bookstore).

Subscriptions and orders should be addressed to American Mathematical Society, P.O. Box 845904, Boston, MA 02284-5904, USA. *All orders must be accompanied by payment.* Other correspondence should be addressed to 201 Charles St., Providence, RI 02904-2294, USA.

**COPYING AND REPRINTING.** Material in this journal may be reproduced by any means for educational and scientific purposes without fee or permission with the exception of reproduction by services that collect fees for delivery of documents and provided that the customary acknowledgment of the source is given. This consent does not extend to other kinds of copying for general distribution, for advertising or promotional purposes, or for resale. Requests for permission for commercial use of material should be addressed to the Acquisitions Department, American Mathematical Society, 201 Charles St., Providence, Rhode Island 02904-2294, USA. Requests can also be made by e-mail to [reprint-permission@ams.org](mailto:reprint-permission@ams.org).

**Transactions of the Moscow Mathematical Society** (ISSN 0077-1554) is published by the American Mathematical Society, 201 Charles Street, Providence, RI 02904-2294, USA and is mailed from Providence, Rhode Island. Postmaster: Send address changes to Transactions of the Moscow Mathematical Society, American Mathematical Society, 201 Charles Street, Providence, RI 02904-2294, USA.

© 2009, American Mathematical Society. All rights reserved.

This journal is indexed in *Mathematical Reviews* and *Zentralblatt MATH*.

This journal is archived in *Portico*.

The London Mathematical Society is incorporated under Royal Charter and is registered with the Charity Commissioners.

Printed in the United States of America.

⊗ The paper used in this journal is acid-free and falls within the guidelines established to ensure permanence and durability.

10 9 8 7 6 5 4 3 2 1      14 13 12 11 10 09

## CONTENTS

<b>O. Yu. Makarenkov</b> , Poincaré index and periodic solutions of perturbed autonomous systems .....	1
<b>V. I. Arnold</b> , Stochastic and deterministic characteristics of orbits in chaotically looking dynamical systems .....	31
<b>G. A. Chechkin</b> , Asymptotic expansion of eigenelements of the Laplace operator in a domain with a large number of ‘light’ concentrated masses sparsely situated on the boundary. Two-dimensional case .....	71
<b>B. Paneah and P. Paneah</b> , Nonlocal problems in the theory of hyperbolic differential equations .....	135
<b>O. G. Styrts</b> , On the orbit space of a compact linear Lie group with commutative connected component .....	171
<b>N. V. Volosova</b> , A global dimension theorem for quantized Banach algebras ...	207
<b>A. I. Aptekarev and D. N. Tulyakov</b> , On the determinant of an integral lattice generated by rational approximants of the Euler constant .....	237

RUSSIAN CONTENTS\*

*О. Ю. Макаренко*

Индекс Пуанкаре и периодические решения  
возмущенных автономных систем . . . . . 4

*В. И. Арнольд*

Стохастические и детерминистские статистики орбит  
в хаотически выглядящих динамических системах . . . . . 46

*Г. А. Чечкин*

Асимптотическое разложение собственных элементов  
оператора Лапласа в области с большим количеством  
«лёгких» концентрированных масс, редко  
расположенных на границе. Двумерный случай . . . . . 102

*Б. Панеях, П. Панеях*

Нелокальные задачи в теории  
гиперболических дифференциальных уравнений . . . . . 183

*О. Г. Стырт*

О пространстве орбит компактной линейной  
группы Ли с коммутативной связной компонентой . . . . . 235

*Н. В. Волосова*

Теорема о глобальной размерности  
для квантованных банаховых алгебр . . . . . 288

*А. И. Антекарев, Д. Н. Туляков*

Об определителе целочисленной решетки, порожденной  
рациональными аппроксимациями постоянной Эйлера . . . . 329

---

\*The American Mathematical Society scheme for transliteration of Cyrillic may be found at the end of index issues of *Mathematical Reviews*.

Correspondence between *Trudy Moskov. Mat. Obshch.* and *Trans. Moscow Math. Soc.*

Russian	English	Russian	English
<b>12</b> (1963)	<b>1963</b> (1965)	<b>42</b> (1981)	<b>1982</b> , issue 2
<b>13</b> (1965)	<b>1965</b> (1967)	<b>43</b> (1981)	<b>1983</b> , issue 1
<b>14</b> (1965)	<b>1965</b> (1967)	<b>44</b> (1982)	<b>1983</b> , issue 2
<b>15</b> (1966)	<b>1966</b> (1967)	<b>45</b> (1982)	<b>1984</b> , issue 1
<b>16</b> (1967)	<b>1967</b> (1968)	<b>46</b> (1983)	<b>1984</b> , issue 2
<b>17</b> (1967)	<b>17</b> (1969)	<b>47</b> (1984)	<b>1985</b>
<b>18</b> (1968)	<b>18</b> (1969)	<b>48</b> (1985)	<b>1986</b>
<b>19</b> (1968)	<b>19</b> (1969)	<b>49</b> (1986)	<b>1987</b>
<b>20</b> (1968)	<b>20</b> (1971)	<b>50</b> (1987)	<b>1988</b>
<b>21</b> (1970)	<b>21</b> (1971)	<b>51</b> (1988)	<b>1989</b>
<b>22</b> (1970)	<b>22</b> (1972)	<b>52</b> (1989)	<b>1990</b>
<b>23</b> (1970)	<b>23</b> (1972)	<b>53</b> (1990)	<b>1991</b>
<b>24</b> (1971)	<b>24</b> (1974)	<b>54</b> (1992)	<b>1993</b>
<b>25</b> (1971)	<b>25</b> (1973)	<b>55</b> (1994)	<b>1994</b>
<b>26</b> (1972)	<b>26</b> (1974)	<b>56</b> (1995)	<b>1995</b>
<b>27</b> (1972)	<b>27</b> (1975)	<b>57</b> (1996)	<b>1996</b>
<b>28</b> (1973)	<b>28</b> (1975)	<b>58</b> (1997)	<b>1997</b>
<b>29</b> (1973)	<b>29</b> (1976)	<b>59</b> (1998)	<b>1998</b>
<b>30</b> (1974)	<b>30</b> (1976)	<b>60</b> (1999)	<b>1999</b>
<b>31</b> (1974)	<b>31</b> (1976)	<b>61</b> (2000)	<b>2000</b>
<b>32</b> (1975)	<b>32</b> (1977)	<b>62</b> (2001)	<b>2001</b>
<b>33</b> (1976)	<b>1978</b> , issue 1	<b>63</b> (2002)	<b>2002</b>
<b>34</b> (1977)	<b>1978</b> , issue 2	<b>64</b> (2003)	<b>2003</b>
<b>35</b> (1976)	<b>1979</b> , issue 1	<b>65</b> (2004)	<b>2004</b>
<b>36</b> (1978)	<b>1979</b> , issue 2	<b>66</b> (2005)	<b>2005</b>
<b>37</b> (1978)	<b>1980</b> , issue 1	<b>67</b> (2006)	<b>2006</b>
<b>38</b> (1979)	<b>1980</b> , issue 2	<b>68</b> (2007)	<b>2007</b>
<b>39</b> (1979)	<b>1981</b> , issue 1	<b>69</b> (2008)	<b>2008</b>
<b>40</b> (1979)	<b>1981</b> , issue 2	<b>70</b> (2009)	<b>2009</b>
<b>41</b> (1980)	<b>1982</b> , issue 1		



0077-1554(2009)70;1-G