

# Theory of Probability and Mathematical Statistics

---

Number 85 2012

---

*A Translation of*

ТЕОРІЯ  
ЙМОВІРНОСТЕЙ ТА  
МАТЕМАТИЧНА  
СТАТИСТИКА

ВИПУСК 85 2011



---

American Mathematical Society

---

Providence, Rhode Island USA  
ISSN 0094-9000

# THEORY OF PROBABILITY AND MATHEMATICAL STATISTICS

*A translation of*

## ТЕОРІЯ ЙМОВІРНОСТЕЙ ТА МАТЕМАТИЧНА СТАТИСТИКА

Originally published in Ukrainian by TBiMC.

© TBiMC, 2011

© Київський університет, 2011

### Editorial Board

A. V. Skorokhod (Editor-in-Chief)

Yu. V. Kozachenko (Deputy Editor-in-Chief)

L. M. Sakhno (Executive Secretary)

V. V. Anisimov

Yu. S. Mishura

V. V. Buldygin

M. P. Moklyachuk

O. V. Ivanov

M. I. Portenko

N. V. Kartashov

E. Seneta

V. S. Korolyuk

D. S. Sil'vestrov

M. M. Leonenko

O. K. Zakusilo

**SUBSCRIPTION INFORMATION.** The 2012 subscription is for Numbers 84 and 85. Beginning in 2004, *Theory of Probability and Mathematical Statistics* is accessible from [www.ams.org/journals/](http://www.ams.org/journals/). Subscription prices for 2012 are as follows: for paper delivery, US\$783 list; US\$626 institutional member; for electronic delivery, US\$689 list, US\$551.20 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\$7; subscribers in India must pay a postage surcharge of US\$13. Expedited delivery to destinations in North America US\$10; elsewhere US\$25. Subscription renewals are subject to late fees. See [www.ams.org/journal-faq](http://www.ams.org/journal-faq) for more journal subscription information.

**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 Street, 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 Street, Providence, Rhode Island 02904-2294, USA. Requests can also be made by e-mail to [reprint-permission@ams.org](mailto:reprint-permission@ams.org).

**Theory of Probability and Mathematical Statistics** (ISSN 0094-9000) 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 Theory of Probability and Mathematical Statistics, American Mathematical Society, 201 Charles Street, Providence, RI 02904-2294, USA.

© 2012, American Mathematical Society. All rights reserved.

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

This journal is archived in *Portico* and in *CLOCKSS*.

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      17 16 15 14 13 12

# Theory of Probability and Mathematical Statistics

---

Number 85 2012

---

*A Translation of*

ТЕОРІЯ  
ЙМОВІРНОСТЕЙ ТА  
МАТЕМАТИЧНА  
СТАТИСТИКА

ВИПУСК 85 2011



---

American Mathematical Society

---

Providence, Rhode Island USA  
ISSN 0094-9000

# THEORY OF PROBABILITY AND MATHEMATICAL STATISTICS

*A translation of*

## ТЕОРІЯ ЙМОВІРНОСТЕЙ ТА МАТЕМАТИЧНА СТАТИСТИКА

Originally published in Ukrainian by TBiMC.

© TBiMC, 2011

© Київський університет, 2011

### Editorial Board

A. V. Skorokhod (Editor-in-Chief)

Yu. V. Kozachenko (Deputy Editor-in-Chief)

L. M. Sakhno (Executive Secretary)

V. V. Anisimov

Yu. S. Mishura

V. V. Buldygin

M. P. Moklyachuk

O. V. Ivanov

M. I. Portenko

N. V. Kartashov

E. Seneta

V. S. Korolyuk

D. S. Sil'vestrov

M. M. Leonenko

O. K. Zakusilo

**SUBSCRIPTION INFORMATION.** The 2012 subscription is for Numbers 84 and 85. Beginning in 2004, *Theory of Probability and Mathematical Statistics* is accessible from [www.ams.org/journals/](http://www.ams.org/journals/). Subscription prices for 2012 are as follows: for paper delivery, US\$783 list; US\$626 institutional member; for electronic delivery, US\$689 list, US\$551.20 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\$7; subscribers in India must pay a postage surcharge of US\$13. Expedited delivery to destinations in North America US\$10; elsewhere US\$25. Subscription renewals are subject to late fees. See [www.ams.org/journal-faq](http://www.ams.org/journal-faq) for more journal subscription information.

**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 Street, 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 Street, Providence, Rhode Island 02904-2294, USA. Requests can also be made by e-mail to [reprint-permission@ams.org](mailto:reprint-permission@ams.org).

**Theory of Probability and Mathematical Statistics** (ISSN 0094-9000) 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 Theory of Probability and Mathematical Statistics, American Mathematical Society, 201 Charles Street, Providence, RI 02904-2294, USA.

© 2012, American Mathematical Society. All rights reserved.

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

This journal is archived in *Portico* and in *CLOCKSS*.

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      17 16 15 14 13 12

## CONTENTS

<b>A. Aissani</b> , Light tailed asymptotics in an unreliable $M/G/1$ retrial queue .....	1
<b>W. Bock and M. Grothaus</b> , A white noise approach to phase space Feynman path integrals .....	7
<b>A. Yu. Veretennikov and A. M. Kulik</b> , Extended Poisson equation for weakly ergodic Markov processes .....	23
<b>O. A. Voïna</b> , Nonparametric estimation for a compound Poisson process governed by a Markov chain .....	41
<b>D. M. Gorodnya</b> , On the existence and uniqueness of solutions of the Cauchy problem for wave equations with general stochastic measures .....	53
<b>D. V. Gusak</b> , A simplified version of Spitzer’s formula for semicontinuous and almost semicontinuous processes .....	61
<b>Z. K. Zerakidze and G. A. Sokhadze</b> , Subordinate statistical structures ....	73
<b>V. S. Koroliuk</b> , Dynamic random evolutions on increasing time intervals .....	83
<b>A. Yu. Pilipenko and Yu. E. Pryhod’ko</b> , Limit behavior of symmetric random walks with a membrane .....	93
<b>I. V. Samoïlenko</b> , Large deviations for random evolutions with independent increments in the scheme of the Poisson approximation .....	107
<b>D. S. Silvestrov and R. Lundgren</b> , Convergence of option rewards for multivariate price processes .....	115
<b>M. A. Fedotkin</b> , Construction and analysis of probability models for controlled evolutionary systems .....	133
<b>D. Hagedorn</b> , Stochastic analysis with the gamma measure—Moving a dense set	149
<b>Georgiy Shevchenko</b> , Local properties of a multifractional stable field .....	159
<b>S. V. Shklyar</b> , Logistic regression with homoscedastic errors—A Berkson model	169
<b>R. E. Yamnenko</b> , Bounds for the distribution of some functionals of processes with $\varphi$ -sub-Gaussian increments .....	181

## UKRAINIAN CONTENTS\*

<i>A. Aissani</i>	Light tailed asymptotics in an unreliable $M/G/1$ retrial queue	1
<i>W. Bock, M. Grothaus</i>	A white noise approach to phase space Feynman path integrals	7
<i>А. Ю. Веретенников, А. М. Кулик</i>	Расширенное уравнение Пуассона для слабо эргодических процессов Маркова	22
<i>О. А. Война</i>	Непараметричне оцінювання для складного пуасонівського процесу, що керується ланцюгом Маркова	39
<i>Д. М. Городня</i>	Про існування та єдиність розв'язків задач Коші для хвильових рівнянь із загальними стохастичними мірами	50
<i>Д. В. Гусак</i>	Спрощення формули Спітцера для напівнеперервних та майже напівнеперервних процесів	56
<i>З. К. Зеракидзе, Г. А. Сохадзе</i>	О подчиненных статистических структурах	66
<i>В. С. Королук</i>	Динамічні випадкові еволюції на зростаючих інтервалах часу	75
<i>А. Ю. Пилипенко, Ю. Є. Приходько</i>	Про граничну поведінку симетричних випадкових блукань з мембранами	84
<i>І. В. Самойленко</i>	Великі відхилення для випадкових еволюцій з незалежними приростами в схемі пуасонової апроксимації	95
<i>D. S. Silvestrov, R. Lundgren</i>	Convergence of option rewards for multivariate price processes	102
<i>М. А. Федоткин</i>	Построение и анализ вероятностных моделей эволюционных систем с управлением	117
<i>D. Hagedorn</i>	Stochastic Analysis with the Gamma measure - Moving a dense set	131
<i>Г. Шевченко</i>	Локальні властивості мультидробового стійкого поля	140
<i>С. В. Шкляр</i>	Логістична регресія з гомоскедастичною похибкою — модель Берксона	150
<i>Р. Є. Ямненко</i>	Про оцінки розподілу деяких функціоналів від процесів з $\varphi$ -субгауссовими приростами	161

---

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





0094-9000(2012)85;1-Z