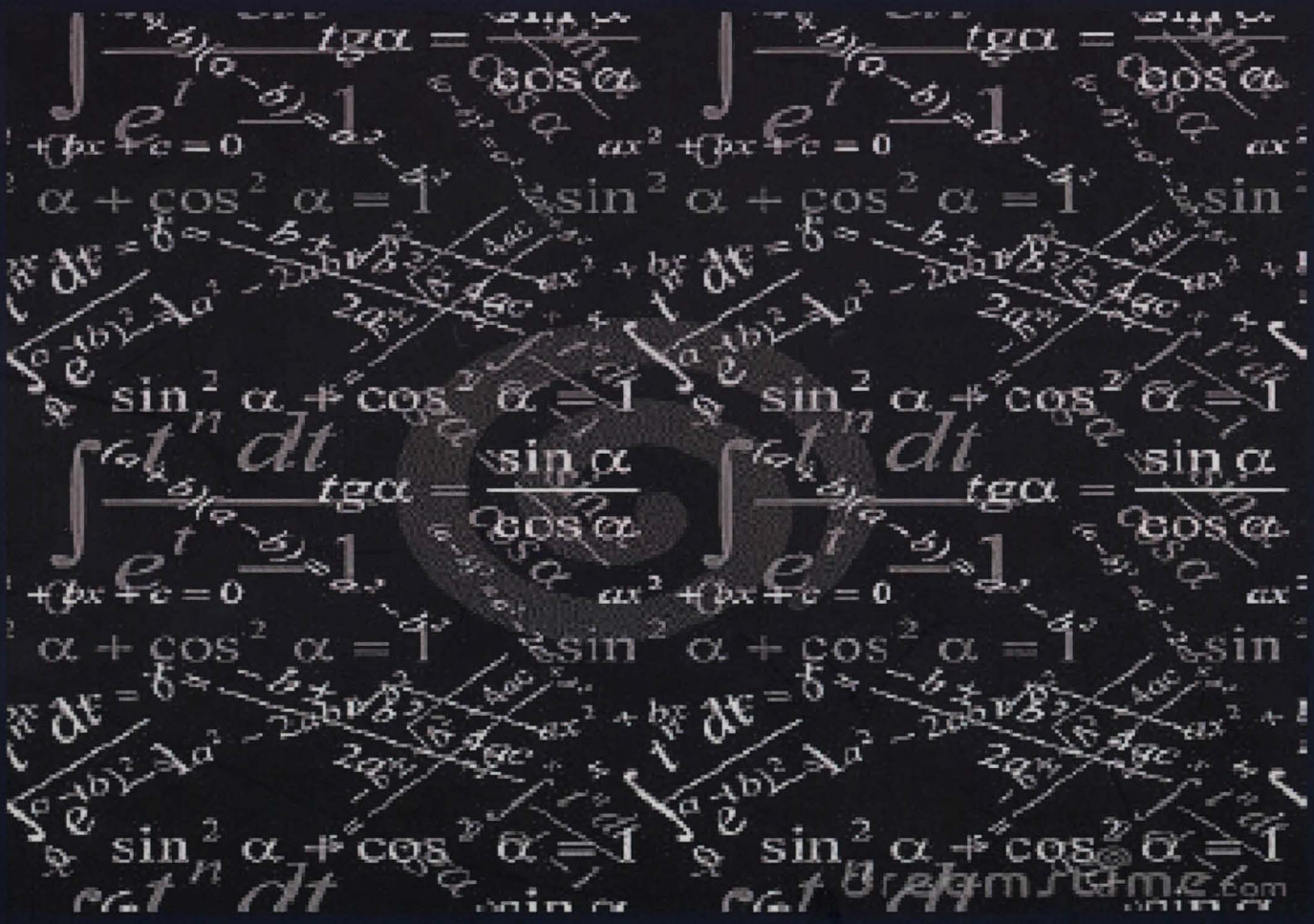
الجامعة الإسلامية العالمية ماليزيا
INTERNATIONAL ISLAMIC UNIVERSITY MALAYSIA
يونيرسيتي إسلام انتارابغسا ملسيا

VOLUME 2

RECENT ACHIEVEMENTS IN DYNAMICAL SYSTEMS

Proceedings of Department of Computational and Theoretical Sciences, Faculty of Science, IIUM



Chief Editor : Farrukh Mukhamedov
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Vol. 2

IIUM Press

Published by:
IIUM Press
International Islamic University Malaysia

First Edition, 2011

Perpustakaan Negara Malaysia Cataloguing-in-Publication Data

Farrukh Mukhamedov, Nasir Ganikhodjaev & Mansoor Saburov
Recent Achievements in Dynamical Systems
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ISBN: 978-967-418-201-4

Member of Majlis Penerbitan Ilmiah Malaysia – MAPIM
(Malaysian Scholarly Publishing Council)

Printed by :
IIUM PRINTING SDN. BHD.
No. 1, Jalan Industri Batu Caves 1/3
Taman Perindustrian Batu Caves
Batu Caves Centre Point
68100 Batu Caves
Selangor Darul Ehsan

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ON L_1-WEAK ERGODOCITY OF NONHOMOGENEOUS DISCRETE MARKOV PROCESSES

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Abstract

In the present paper we investigate the L_1-weak ergodicity of nonhomogeneous discrete Markov processes with general state spaces. Note that the L_1-weak ergodicity is weaker than well-known weak ergodicity. We provide a necessary and sufficient condition for such processes to satisfy the L_1-weak ergodicity.

Keywords: *weak ergodicity; nonhomogeneous discrete Markov process; the Doeblin's Condition; quadratic stochastic process.*

Introduction

Markov processes with general state space have become a subject of interest due to their applications in many branches of mathematics and natural sciences. One of the important notions in these studies is ergodicity of Markov processes, i.e. the tendency for a chain to 'forget' the distant past. In many cases, a huge number of investigations were devoted to such processes with countable state space (see for example, [1]-[7]). For nonhomogeneous Markov processes with countable state space, investigation of the general conditions of weak ergodicity leads to the definition of a special subclass of regular matrices. In many papers (see for example, [3,4]) the weak ergodicity of nonhomogeneous Markov process are given in terms of Dobrushin's ergodicity coefficient [1]. In general case, one may consider several kinds of convergence [10]. Lots of papers were devoted to the investigation of ergodicity of nonhomogeneous Markov chains (see, for example [1]-[5]).

In the present paper we are going to investigate the L_1-weak ergodicity of nonhomogeneous discrete Markov processes, in general state spaces, without using Dobrushin's ergodicity coefficient. Note that the L_1-weak ergodicity is weaker than usual weak ergodicity (see next section). We shall provide necessary and sufficient conditions for such processes to satisfy the L_1-weak ergodicity. As application of the main result, certain concrete examples are provided. It is worth to mention that in [9] a necessary and