



EMS Series of Lectures in Mathematics

Edited by Andrew Ranicki (University of Edinburgh, U.K.)

EMS Series of Lectures in Mathematics is a book series aimed at students, professional mathematicians and scientists. It publishes polished notes arising from seminars or lecture series in all fields of pure and applied mathematics, including the reissue of classic texts of continuing interest. The individual volumes are intended to give a rapid and accessible introduction into their particular subject, guiding the audience to topics of current research and the more advanced and specialized literature.

Previously published in this series:

Katrin Wehrheim, *Uhlenbeck Compactness*

Torsten Ekedahl, *One Semester of Elliptic Curves*

Sergey V. Matveev, *Lectures on Algebraic Topology*

Joseph C. Várilly, *An Introduction to Noncommutative Geometry*

Reto Müller, *Differential Harnack Inequalities and the Ricci Flow*

Eustasio del Barrio, Paul Deheuvels and Sara van de Geer, *Lectures on Empirical Processes*

Iskander A. Taimanov, *Lectures on Differential Geometry*

Martin J. Mohlenkamp, María Cristina Pereyra, *Wavelets, Their Friends, and What They Can Do for You*

Stanley E. Payne and Joseph A. Thas, *Finite Generalized Quadrangles*

Masoud Khalkhali

Basic Noncommutative Geometry



European Mathematical Society

Author:

Masoud Khalkhali
Department of Mathematics
The University of Western Ontario
London, Ontario N6A 5B7
Canada
E-mail: masoud@uwo.ca

2010 Mathematics Subject Classification: 58-02; 58B34

Key words: Noncommutative space, noncommutative quotient, groupoid, cyclic cohomology, Connes–Chern character, index formula

ISBN 978-3-03719-061-6

The Swiss National Library lists this publication in The Swiss Book, the Swiss national bibliography, and the detailed bibliographic data are available on the Internet at <http://www.helvetica.ch>.

This work is subject to copyright. All rights are reserved, whether the whole or part of the material is concerned, specifically the rights of translation, reprinting, re-use of illustrations, recitation, broadcasting, reproduction on microfilms or in other ways, and storage in data banks. For any kind of use permission of the copyright owner must be obtained.

© 2009 European Mathematical Society

Contact address:
European Mathematical Society Publishing House
Seminar for Applied Mathematics
ETH-Zentrum FLI C4
CH-8092 Zürich
Switzerland
Phone: +41 (0)44 632 34 36
Email: info@ems-ph.org
Homepage: www.ems-ph.org

Typeset using the author's $\text{T}_\text{E}\text{X}$ files: I. Zimmermann, Freiburg
Printed on acid-free paper produced from chlorine-free pulp. TCF ∞
Printed in Germany

9 8 7 6 5 4 3 2 1