Mathematik

Karl-Ernst Biebler

Modules over semifields

convexity, normability, inner product,
extension theorems

SHAKER
VERLAG

Modules over semifields: convexity, normability, inner product, extension theorems

Karl-Ernst Erich Biebler

Ernst-Moritz-Arndt-University Greifswald, Germany

Berichte aus der Mathematik

Karl-Ernst Biebler

Modules over semifields

convexity, normability, inner product, extension theorems

Shaker Verlag
Düren 2020

Bibliographic information published by the Deutsche Nationalbibliothek
The Deutsche Nationalbibliothek lists this publication in the Deutsche Nationalbibliografie; detailed bibliographic data are available in the Internet at http://dnb.d-nb.de.

Copyright Shaker Verlag 2020
All rights reserved. No part of this publication may be reproduced, stored in a retrieval system, or transmitted, in any form or by any means, electronic, mechanical, photocopying, recording or otherwise, without the prior permission of the publishers.

Printed in Germany.

ISBN 978-3-8440-7546-5
ISSN 0945-0882

Shaker Verlag GmbH • Am Langen Graben 15a • 52353 Düren
Phone: 0049/2421/99011-0 • Telefax: 0049/2421/99011-9
Internet: www.shaker.de • e-mail: info@shaker.de

To my daughter Sophie

Contents

1 Introduction **5**

2 Semifields **9**
2.1 Complete vector lattices 9
2.2 F-ordered rings 15
2.3 Semifields 17
2.4 Topological semifields 22

3 Modules over semifields **37**
3.1 S-convex sets 37
3.2 S-lineartopological modules and S-norms 47
3.3 Inner product 66

4 Extension theorems **75**
4.1 The extension of monotonous S-linear functionals . . 78
4.2 Hahn-Banach type theorems 98
4.3 Applications of extension theorems 108

Bibliography **115**