Nonlinear Functional Analysis and its Applications

II/B: Nonlinear Monotone Operators

David Hilbert (1862–1943)

Eberhard Zeidler

Nonlinear Functional Analysis and its Applications

II/B: Nonlinear Monotone Operators

Translated by the Author and by Leo F. Boron†

With 74 Illustrations

Springer Science+Business Media, LLC

Eberhard Zeidler
Sektion Mathematik
Karl-Marx-Platz
7010 Leipzig
German Democratic Republic

Leo F. Boron†
Department of Mathematics
University of Idaho
Moscow, ID 83843
U.S.A.

Mathematics Subject Classification (1980): 46xx

Library of Congress Cataloging in Publication Data
(Revised for vol. 2 pts. A-B)
Zeidler, Eberhard.
Vol. 2, pts. A-B: Translated by the author and Leo L. Boron.
Vol. 3: Translated by Leo L. Boron.
Vol. 4: Translated by Juergen Quandt.
Includes bibliographies and indexes.
Contents: 1. Fixed point theorems — 2. pt A. Linear monotone operators. Pt. B Nonlinear operators — [etc.] — 4. Applications to mathematical physics.
1. Nonlinear functional analysis. I. Title.
QA321.5.Z4513 1985 515.7 83-20455

Printed on acid-free paper
Previous edition, *Vorlesungen über nichtlineare Funktionalanalysis*, Vols. I–III, published by B. G. Teubner Verlagsgesellschaft, 7010 Leipzig, Sternwartenstrasse 8, Deutsche Demokrati Republik.

Originally published by Springer-Verlag New York in 1990
Softcover reprint of the hardcover 1st edition 1990

Typeset by Asco Trade Typesetting Ltd., Hong Kong.

9 8 7 6 5 4 3 2 1

ISBN 978-1-4612-6969-4 ISBN 978-1-4612-0981-2 (eBook)
DOI 10.1007/978-1-4612-0981-2

To the memory of my parents

Preface to Part II/B

The present book is part of a comprehensive exposition of the main principles of nonlinear functional analysis and its numerous applications to the natural sciences and mathematical economics. The presentation is self-contained and accessible to a broader audience of mathematicians, natural scientists, and engineers. The material is organized as follows:

Part I: Fixed-point theorems.
Part II: Monotone operators.
Part III: Variational methods and optimization.
Parts IV/V: Applications to mathematical physics.

Here, Part II is divided into two subvolumes:

Part II/A: Linear monotone operators.
Part II/B: Nonlinear monotone operators.

These two subvolumes form a *unit* equipped with a uniform pagination. The contents of Parts II/A and II/B and the basic strategies of our presentation have been discussed in detail in the Preface to Part II/A. The present volume contains the complete index material for Parts II/A and II/B.

For valuable hints I would like to thank Ina Letzel, Frank Benkert, Werner Berndt, Günther Berger, Hans-Peter Gittel, Matthias Günther, Jürgen Herrler, and Rainer Schumann. I would also like to thank Professor Stefan Hildebrandt for his generous hospitality at the SFB in Bonn during several visits in the last few years. In conclusion, I would like to thank Springer-Verlag for a harmonious collaboration.

Leipzig
Summer 1989

Eberhard Zeidler

Contents (Part II/B)

Contents (Part II/A)