Eberhard Zeidler

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# Applied Functional Analysis

## Main Principles and Their Applications

Springer-Verlag

# Contents

This is the second part of an elementary textbook which combines linear functional analysis, nonlinear functional analysis, numerical functional analysis, and their substantial applications with each other. The book addresses undergraduate students and beginning graduate students of mathematics, physics, and engineering who want to learn how functional analysis elegantly solves mathematical problems which relate to our real world and which play an important role in the history of mathematics. The book's approach begins with the question "what are the most important applications" and proceeds to try to answer this question. The applications concern integral equations, differential equations, bifurcation theory, the moment problem, Čebyšev approximation, the optimal control of rockets, game theory, symmetries and conservation laws (the Noether theorem), the quark model, and gauge theory in elementary particle physics. The presentation is self-contained. As for prerequisites, the reader should be familiar with some basic facts of calculus.

The first part of this textbook has been published under the title *Applied Functional Analysis: Applications to Mathematical Physics*

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