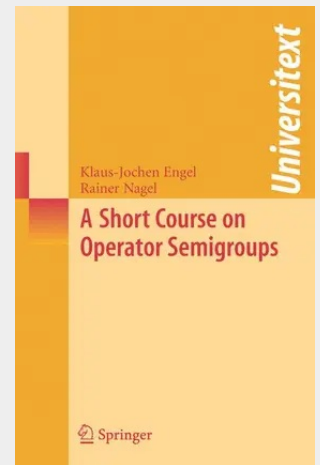


A Short Course on Operator Semigroups

The book offers a direct and up-to-date introduction to the theory of one-parameter semigroups of linear operators on Banach spaces. It contains the fundamental results of the theory such as the Hille-Yosida generation theorem, the bounded perturbation theorem, and the Trotter-Kato approximation theorem. It also treats the spectral theory of semigroups and its consequences for the qualitative behavior. The book is intended for students and researchers who want to become acquainted with the concept of semigroups in order to work with it in fields like partial and functional differential equations, stochastic processes, infinite dimensional control theory, or dynamical systems coming from physics or biology. Exercises are provided at the end of the chapters.

The theory of strongly continuous semigroups of linear operators on Banach spaces, operator semigroups for short, has become an indispensable tool in a great number of areas of modern mathematical analysis. In our Springer Graduate Text [EN00] we presented this beautiful theory, together with many applications, and tried to show the progress made since the publication in 1957 of the now classical monograph [HP57] by E. Hille and R. Phillips. However, the wealth of results exhibited in our Graduate Text seems to have discouraged some of the potentially interested readers. With the present text we offer a streamlined version that strictly sticks to the essentials. We have skipped certain parts, avoided the use of sophisticated arguments, and, occasionally, weakened the formulation of results and modified the proofs. However, to a large extent this book consists of excerpts taken from our Graduate Text, with some new material on positive semigroups added in Chapter VI. We hope that the present text will help students take their first step into this interesting and lively research field. On the other side, it should provide useful tools for the working mathematician.

Acknowledgments This book is dedicated to our students. Without them we would not be able to do and to enjoy mathematics. Many of them read previous versions when it served as the text of our Seventh Internet Seminar 2003/04. Here Genni Fragnelli, Marc Preunkert and Mark C. Veraar were among the most active readers. Particular thanks go to Tanja Eisner, Vera Keicher, Agnes Radl for proposing considerable improvements in the final version.



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