

Preface

This book represents the fruits of our collaboration on the variable Lebesgue spaces. Our work in this area stretches back over a decade. Its genesis is memorable: it began in Naples during an exceptionally cold January in 2002, shortly after the introduction of the euro. We worked through the details of a preprint we had received from our colleague Lars Diening which gave conditions for the maximal operator to be bounded on variable Lebesgue spaces defined on bounded sets. Our first task was to try to understand these previously unknown spaces. The more we worked with them, the more intrigued we became. Subsequently, we began to study the maximal operator on unbounded domains; a search for applications led us to the other classical operators of harmonic analysis and the interplay between weighted norm inequalities and variable Lebesgue spaces.

In 2007, the first author was invited to teach a graduate course on variable Lebesgue spaces at the University of Naples, Federico II, an invitation he gladly accepted. The notes for that course became the basis for this book. One problem, however, was that our knowledge of the field continued to evolve even as we tried to convert those notes into a final manuscript. Instead of writing we would stop to prove new theorems, leading to repeated revisions and expansions of the text. At this point, however, we think we have reached a reasonable place to stop: we have written (we believe) an introduction to variable Lebesgue spaces that will be useful for a wide audience. Simply put, we think we have finally gotten it right.

Many individuals have contributed directly and indirectly to this book. We want to acknowledge the late Christoph Neugebauer, who collaborated with us on our first paper on variable Lebesgue spaces and provided key insights. We want to thank our colleagues Lars Diening, Peter Hästö, Aleš Nekvinda and Stefan Samko, who freely shared with us preprints of their work. Their generosity kept us abreast of a very rapidly evolving field. We want to thank Jean Michel Rakotonson for his collegiality and for sharing with us his ideas and questions on variable Lebesgue spaces. We also want to thank our colleague Claudia Capone and the students who attended the variable Lebesgue space course for their patience as we tried for the first time to shape our knowledge into a coherent whole. We especially want to thank Carlo Sbordone, who first brought us together and has provided continuing support and

encouragement for our joint labors. And finally, we want to thank our wives and our children for patiently bearing with us as this book became a reality.

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