Preface

Although this book deals with some selected topics of the theory of function spaces and the indicated applications, we tried to make it independently readable. For this purpose we provide in Chapter 1 notation and basic facts, give detailed references and prove some specific assertions.

Chapters 2 and 3 deal with Haar bases and Faber bases in function spaces of type B^s_{pq} and F^s_{pq}, covering some (fractional) Sobolev spaces, (classical) Besov spaces and Hölder–Zygmund spaces. In higher dimensions preference is given to several types of spaces with dominating mixed smoothness. This paves the way to study in Chapters 4 and 5 sampling and numerical integration for corresponding spaces on cubes and more general domains. It is well known that numerical integration is symbiotically related to discrepancy, the theory of irregularities of distribution of points, preferably in cubes. This is subject of Chapter 6.

Formulas are numbered within chapters. Furthermore in each chapter all definitions, theorems, propositions, corollaries and remarks are jointly and consecutively numbered. Chapter n is divided in sections $n.k$ and subsections $n.k.l$. But when quoted we refer simply to Section $n.k$ or Section $n.k.l$ instead of Section $n.k$ or Subsection $n.k.l$. If there is no danger of confusion (which is mostly the case) we write A^s_{pq}, $S^r_{pq}A$, …, a^s_{pq}, $s^r_{pq}a$ …(spaces) instead of $A^s_{p,q}$, $S^r_{p,q}A$, …, $a^s_{p,q}$, $s^r_{p,q}a$ …. Similarly a_{jm}, λ_{jm}, Q_{km} (functions, numbers, rectangles) instead of $a_{j,m}$, $\lambda_{j,m}$, $Q_{k,m}$ etc. References ordered by names, not by labels, which roughly coincides, but may occasionally cause minor deviations. The number(s) behind ► in the Bibliography mark the page(s) where the corresponding entry is quoted. log is always taken to base 2. All unimportant positive constants will be denoted by c (with additional marks if there are several c's in the same formula). Our use of $\sim$ (equivalence) is explained on p. 176.

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Jena, Spring 2010 Hans Triebel