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Nota di contenuto	Frames in Finite-dimensional Inner Product Spaces -- Infinite-dimensional Vector Spaces and Sequences -- Bases -- Bases and their Limitations -- Frames in Hilbert Spaces -- Tight Frames and Dual Frame Pairs -- Frames versus Riesz Bases -- Selected Topics in Frame Theory -- Frames of Translates -- Shift-Invariant Systems in l2(R) -- Gabor Frames in L2(R) -- Gabor Frames and Duality -- Selected Topics on Gabor Frames -- Gabor Frames in 2(Z),L2(0,L),CL -- General Wavelet Frames in L2(R) -- Dyadic Wavelet Frames for L2(R) -- Frame Multiresolution Analysis -- Wavelet Frames via Extension Principles -- Selected Topics on Wavelet Frames -- Generalized Shift-Invariant Systems in L2(Rd) -- Frames on Locally Compact Abelian Groups -- Perturbation of Frames -- Approximation of the Inverse Frame Operator -- Expansions in Banach Spaces. Appendix.

Sommario/riassunto

This revised and expanded monograph presents the general theory for frames and Riesz bases in Hilbert spaces as well as its concrete realizations within Gabor analysis, wavelet analysis, and generalized shift-invariant systems. Compared with the first edition, more emphasis is put on explicit constructions with attractive properties. Based on the exiting development of frame theory over the last decade, this second edition now includes new sections on the rapidly growing fields of LCA groups, generalized shift-invariant systems, duality theory for as well Gabor frames as wavelet frames, and open problems in the field. Key features include: *Elementary introduction to frame theory in finite-dimensional spaces * Basic results presented in an accessible way for both pure and applied mathematicians * Extensive exercises make the work suitable as a textbook for use in graduate courses * Full proofs includ ed in introductory chapters; only basic knowledge of functional analysis required * Explicit constructions of frames and dual pairs of frames, with applications and connections to time-frequency analysis, wavelets, and generalized shift-invariant systems * Discussion of frames on LCA groups and the concrete realizations in terms of Gabor systems on the elementary groups; connections to sampling theory * Selected research topics presented with recommendations for more advanced topics and further readin g * Open problems to stimulate further research An Introduction to Frames and Riesz Bases will be of interest to graduate students and researchers working in pure and applied mathematics, mathematical physics, and engineering. Professionals working in digital signal processing who wish to understand the theory behind many modern signal processing tools may also find this book a useful self-study reference. Review of the first edition: "Ole Christensen's An Introduction to Frames and Riesz Bases is a first-rate introduction to the field … . The book provides an excellent exposition of these topics. The material is broad enough to pique the interest of many readers, the included exercises supply some interesting challenges, and the coverage provides enough background for those new to the subject to begin conducting original research." — Eric S. Weber, American Mathematical Monthly, Vol. 112, February, 2005 .