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Nota di contenuto	Contents; Preface; Acknowledgements; 1 Leibnitz rules and the generalized Korteweg-de Vries equation; 1.1 Conserved quantities; 1.2 Dispersive estimates for the linear equation; 1.3 Dispersive estimates for the nonlinear equation; 1.4 Wave packets and phase-space portraits; 1.5 The phase-space portraits of e2ix2 and e2ix3; 1.6 Asymptotics for the Airy function; Notes; Problems; 2 Classical paraproducts; 2.1 Paraproducts; 2.2 Discretized paraproducts; 2.3 Discretized Littlewood-Paley square-function operator; 2.4 Dualization of quasi-norms; 2.5 Two particular cases of Theorem 2.3 3.7 Proof of Theorem 3.1 part 2; 3.8 Multiparameter paraproducts; 3.9 Proof of Theorem 3.1; a simplification; 3.10 Proof of the generic decomposition; Notes; Problems; 4 Calder on commutators and the Cauchy integral; 4.1 History; 4.2 The first Calder on commutator; 4.3 Generalizations; 4.4 The Cauchy integral on Lipschitz curves; 4.5 Generalizations; Notes; Problems; 5 Iterated Fourier series and physical

reality; 5.1 Iterated Fourier series; 5.2 Physical reality; 5.3 Generic Lp AKNS systems for 1p < 2; 5.4 Generic L2 AKNS systems; Notes; Problems; 6 The bilinear Hilbert transform
6.1 Discretization6.2 The particular scale-1 case of Theorem 6.5; 6.3 Trees, L2 sizes, and L2 energies; 6.4 Proof of Theorem 6.5; 6.5 Bessel-type inequalities; 6.6 Stopping-time decompositions; 6.7 Generic estimate of the trilinear BHT form; 6.8 The 1/2 < r < 2/3 counterexample; 6.9 The bilinear Hilbert transform on polydisks; Notes; Problems; 7 Almost everywhere convergence of Fourier series; 7.1 Reduction to the continuous case; 7.2 Discrete models; 7.3 Proof of Theorem 7.2 in the scale-1 case; 7.4 Estimating a single tree; 7.5 Additional sizes and energies; 7.6 Proof of Theorem 7.2
7.7 Estimates for Carleson energies7.8 Stopping-time decompositions; 7.9 Generic estimate of the bilinear Carleson form; 7.10 Fefferman's counterexample; Notes; Problems; 8 Flag paraproducts; 8.1 Generic flag paraproducts; 8.2 Mollifying a product of two paraproducts; 8.3 Flag paraproducts and quadratic NLS; 8.4 Flag paraproducts and U-statistics; 8.5 Discrete operators and interpolation; 8.6 Reduction to the model operators; 8.7 Rewriting the 4-linear forms; 8.8 The new size and energy estimates; 8.9 Estimates for T1 and T1,l0 near A4; 8.10 Estimates for T1*3 and T*31,l0 near A31 and A32
8.11 Upper bounds for flag sizes

Sommario/riassunto

This two-volume text in harmonic analysis introduces a wealth of analytical results and techniques. It is largely self-contained and useful to graduates and researchers in pure and applied analysis. Numerous exercises and problems make the text suitable for self-study and the classroom alike. The first volume starts with classical one-dimensional topics: Fourier series; harmonic functions; Hilbert transform. Then the higher-dimensional Calderon-Zygmund and Littlewood-Paley theories are developed. Probabilistic methods and their applications are discussed, as are applications of harmonic analysis to partial differential equations. The volume concludes with an introduction to the Weyl calculus. The second volume goes beyond the classical to the highly contemporary and focuses on multilinear aspects of harmonic analysis: the bilinear Hilbert transform; Coifman-Meyer theory; Carleson's resolution of the Lusin conjecture; Calderon's commutators and the Cauchy integral on Lipschitz curves. The material in this volume has not previously appeared together in book form.