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Nota di contenuto	1 Unitary Representations -- 2 Abelian Groups -- 3 Compact Groups -- 4 Lie Algebras and Unitary Representations of $SU(2, \mathbb{R})$ -- 5 Normal Abelian Subgroups and Unitary Duals -- 6 Weak Containment and the Fell Topology -- 7 Smooth Vectors and Decay for $SL(3, \mathbb{R})$ -- 8 Discrete Series Representations and Temperedness -- 9 Unitary Representations of $SL(2, \mathbb{R})$ -- Appendix A: Linear Algebra -- Appendix B: Analysis -- Appendix C: Topological Groups.
Sommario/riassunto	This graduate textbook introduces the unitary representation theory of groups, emphasizing applications in fields like dynamical systems. It begins with the general theory and motivation, then explores key classes of groups. Abelian and compact groups are treated through Pontryagin duality and the Peter–Weyl theorem. Metabelian groups illustrate links to ergodic theory and lead to the Mackey machine. Weak

containment and the Fell topology are introduced through examples. The final chapters apply the theory to special linear groups in dimensions two and three, covering smooth vectors, spectral gaps, and decay of matrix coefficients. The two-dimensional case is examined in depth, including the Kunze–Stein phenomenon, spectral decomposition on the hyperbolic plane, and the Weil representation. The book concludes with a full description of the unitary dual of $SL(2, \mathbb{R})$ and its Fell topology, applying the theory to prove effective equidistribution of horocycle orbits. With its focus on key examples and concrete explanations, this textbook is aimed at graduate students taking first steps in unitary representation theory. It builds the theory from the ground up, requiring only some familiarity with functional analysis beyond standard undergraduate mathematics.
