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| Nota di contenuto | Introduction and motivation -- Krylov solvability of bounded linear inverse problems -- An analysis of conjugate-gradient based methods with unbounded operators -- Krylov solvability of unbounded inverse problems -- Krylov solvability in a perturbative framework -- Outlook on general projection methods and weaker convergence -- References -- Index. |
| Sommario/riassunto | This book presents a thorough discussion of the theory of abstract inverse linear problems on Hilbert space. Given an unknown vector f in a Hilbert space H, a linear operator A acting on H, and a vector g in H satisfying Af=g, one is interested in approximating f by finite linear combinations of g, Ag, A2g, A3g, … The closed subspace generated by the latter vectors is called the Krylov subspace of H generated by g and A. The possibility of solving this inverse problem by means of projection methods on the Krylov subspace is the main focus of this text. After giving a broad introduction to the subject, examples and |

counterexamples of Krylov-solvable and non-solvable inverse problems are provided, together with results on uniqueness of solutions, classes of operators inducing Krylov-solvable inverse problems, and the behaviour of Krylov subspaces under small perturbations. An appendix collects material on weaker convergence phenomena in general projection methods. This subject of this book lies at the boundary of functional analysis/operator theory and numerical analysis/approximation theory and will be of interest to graduate students and researchers in any of these fields. .