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Titolo	Variational Source Conditions, Quadratic Inverse Problems, Sparsity Promoting Regularization : New Results in Modern Theory of Inverse Problems and an Application in Laser Optics / / by Jens Flemming
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Descrizione fisica	1 online resource (180 pages)
Collana	Frontiers in Mathematics, , 1660-8046
Disciplina	515.357
Soggetti	Numerical analysis Operator theory Numerical Analysis Operator Theory
Lingua di pubblicazione	Inglese
Formato	Materiale a stampa
Livello bibliografico	Monografia
Nota di contenuto	Inverse problems, ill-posedness, regularization -- Variational source conditions yield convergence rates -- Existence of variational source conditions -- What are quadratic inverse problems? -- Tikhonov regularization -- Regularization by decomposition -- Variational source conditions -- Aren’t all questions answered? -- Sparsity and 1-regularization -- Ill-posedness in the l1-setting -- Convergence rates.
Sommario/riassunto	The book collects and contributes new results on the theory and practice of ill-posed inverse problems. Different notions of ill-posedness in Banach spaces for linear and nonlinear inverse problems are discussed not only in standard settings but also in situations up to now not covered by the literature. Especially, ill-posedness of linear operators with uncomplemented null spaces is examined. Tools for convergence rate analysis of regularization methods are extended to a wider field of applicability. It is shown that the tool known as variational source condition always yields convergence rate results. A theory for nonlinear inverse problems with quadratic structure is developed as well as corresponding regularization methods. The new methods are applied to a difficult inverse problem from laser optics. Sparsity promoting regularization is examined in detail from a Banach

space point of view. Extensive convergence analysis reveals new insights into the behavior of Tikhonov-type regularization with sparsity enforcing penalty.