

On Inverse Problems, Regularization, Level Sets and Conjugate Gradients

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Abstract: Reconstruction problems of 3D distributed parameter functions lead to very large optimization problems involving millions of variables. This is where practical optimization and PDE methods are combined. The challenge becomes even more involved when the parameter functions have discontinuities or very sharp gradients, which occurs often in applications. I will describe various issues related to methods that we have developed and applied, including Huber regularization, level set methods, mesh refinement and the surprising effect of conjugate gradient iterations. The concept of regularization is the common thread.

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