Shape optimization approach for sharp-interface reconstructions in inverse problems.

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Abstract: Working within the class of piecewise constant models, inverse problems can be recast as shape optimization problems where the discontinuity interface is the unknown. The sensitivity analysis of the cost functional relies on shape optimization techniques and in particular on the concept of shape derivatives. I will show several recent developments including a shape-Lagrangian approach for point measurements, and distributed shape derivatives for geometries with low regularity. Numerical results based on a level set approach will be presented for the inverse problems of electrical impedance tomography and full waveform inversion.