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Martin Burger* (martin.burger@jku.at), Institut für Industriemathematik, JKU,
Altenbergerstr. 69, A 4040 Linz, Austria. *Level sets in inverse problems and optimization I.*

In this talk we give an introduction to level set methods for inverse and optimization problems involving unknown geometries. We construct a gradient flow framework, which finally reduces to appropriate preconditioning of shape gradients for the choice of normal velocities used to move the boundary of the unknown shape towards a solution.

The application to several problems in inverse obstacle reconstruction and shape optimization are also discussed. (Received September 20, 2005)