

## REGULARIZATION PROPERTIES OF TIKHONOV REGULARIZATION WITH SPARSITY CONSTRAINTS\*

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**Abstract.** In this paper, we investigate the regularization properties of Tikhonov regularization with a sparsity (or Besov) penalty for the inversion of nonlinear operator equations. We propose an a posteriori parameter choice rule that ensures convergence in the used norm as the data error goes to zero. We show that the method of surrogate functionals will at least reconstruct a critical point of the Tikhonov functional. Finally, we present some numerical results for a nonlinear Hammerstein equation.

**Key words.** inverse problems, sparsity

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