

Regularization methods and the small ball property

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We obtain bounds on estimation error rates for regularization procedures with respect to the quadratic loss and any regularization function Ψ . In particular, it sheds some light on the role various notions of sparsity have in regularization and on their connection with the size of subdifferentials of Ψ in a neighbourhood of the true minimizer. As ‘proof of concept’ we extend the known estimates for the LASSO, SLOPE and trace norm regularization.