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Miguel del Alamo* (miguel.delalamo@stud.uni-goettingen.de), Institute for Mathematical Stochastics, Georg-August-University Goettingen, Goldschmidtstrasse 7, 37077 Goettingen, Germany, and **Axel Munk** and **Housen Li**. *Variational Multiscale Estimators for Nonparametric Regression and Statistical Inverse Problems*.

In the context of nonparametric regression and statistical inverse problems, we introduce and analyze a variational approach called MultIscale Nemirovski-Dantzig (MIND) estimator. This estimator can be viewed as a multiscale extension of the Dantzig selector that relies on early ideas of Nemirovski. More precisely, the MIND minimizes a homogeneous Sobolev norm subject to the constraint that the multiresolution norm of the residuals be bounded by a universal threshold. We will show that the MIND attains almost minimax optimal convergence rates with respect to the L^q -risk, $1 \leq q \leq \infty$, both almost surely and in expectation. Furthermore, it partially adapts to the smoothness of the function to be estimated over a certain range of Sobolev classes.

In this talk we will review this approach and illustrate its performance in several Monte Carlo simulations and real data examples from cell microscopy. (Received September 19, 2016)