



**Lecture Series** 

of the German-Swiss research group FOR 916 "Statistical Regularization" and the research group 1023 "Identification in Mathematical Models"

on

## "Adaptive estimation via oracle approach"

by

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## Abstract

The presented series of lectures is an introduction in the modern theory of adaptive estimation. The main ingredient of this theory is the oracle approach and the first part of the course will be devoted to the detailed explanation of this approach and its relation to the minimax and minimax adaptive estimation. Next, we present the universal estimation routine based on a random choice from the collection of linear estimators and establish for it so-called oracle inequality. The basic technical tools here are the commutativity property of some integral operators and upper functions for positive random functionals. All these considerations will be done in the frameworks of an abstract statistical model that allows to explain main ideas "neglecting" technical details. In the last part of the course we apply our general estimation scheme to the specific problems arising in particular statistical models mostly in density estimation.