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A GENERAL MINIMAX LOWER BOUND FOR ESTIMATING AN ARBITRARY NON-SMOOTH FUNCTIONAL

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ABSTRACT

In this study, an overarching MiniMax lower bound (MLB) was formulated to create the MiniMax Risk. This MiniMax Risk serves as a tool for assessing any non-smooth functional estimations. Both the Minimax lower and upper bounds play a crucial role in determining the fundamental limits and setting benchmarks for evaluating the performance of any statistical estimator. When dealing with nonparametric estimation of statistical functionals, it's essential to establish both lower and upper bounds. Particularly within the realm of MiniMax estimation, the lower bounds hold significant importance. Estimating non-smooth functionals poses distinct properties compared to the estimation of typical smooth functionals. Consequently, standard methods often fall short in providing accurate results for estimating non-smooth functionals. To address these challenges, a set of priors with substantial differences in the functional expected values was created, while minimizing the Chi-square distance between two normal mixtures.

Keywords: Minimax, Lower Bounds, Estimator