

On Hodges' superefficiency and merits of oracle property in model selection

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Abstract The oracle property of model selection procedures has attracted a large volume of favorable publications in the literature, but also faced criticisms of being ineffective and misleading in applications. Such criticisms, however, have appeared to be largely ignored by the majority of the popular statistical literature, despite their serious impact. In this paper, we present a new type of Hodges' estimators that can easily produce model selection procedures with the oracle and some other desired properties, but can be readily seen to perform poorly in parts of the parameter spaces that are fixed and independent of sample sizes. Consequently, the merits of the oracle property for model selection as extensively advocated in the literature are questionable and possibly overstated. In particular, because the mathematics employed in this paper are at an elementary level, this finding leads to new discoveries on the merits of the oracle property and exposes some overlooked crucial facts on model selection procedures.

Keywords Hodges' estimator · Model selection · Oracle property · Penalized maximum likelihood/least squares · Superefficiency

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