Optimally one-sided bounded ICs

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We consider the problem of estimating a one-dimensional parameter θ in a smooth parametric model when deviations from the "true" θ have to be judged in an asymmetric way, because underestimation is no problem while overestimation is. In the infinitesimal robust setup, we solve a corresponding asymmetric problem for as. linear estimators S_n:

$$\min \operatorname{asVar}_{\mathrm{id}}(S_n) \qquad \text{s.t. } \sup_{Q_n} \operatorname{asBias}_{Q_n}(S_n) \le b \tag{1}$$

for some bound b and where the subscript $_{\mathrm{id}}$ stands for evaluation in the ideal model, while in the side condition Q_n ranges in some $r/\sqrt{n}$-shrinking neighborhood about the ideal model and only positive biases are taken into account. We solve this problem for convex-contamination-, for total-variation-, and Hellinger-neighborhoods.
One-sided analoga to the mean squared error are introduced which give objective criteria for the choice of b depending only on the size of the neighborhood.
The one-sided problems may be interpreted as limiting cases of the problem with asymmetric upper and lower bounds for the bias.
Numerically, in the Gaussian location model, we compare the optimal one-sided clipped solutions to the corresponding two-sided clipped ones as to the one-sided criterium. We also address the problem of not knowing the neighborhood radius, translating the setup of Rieder et al. (2001) into ours.

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