Wilcoxon-type generalized Bayesian information criterion

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Abstract: We extend the basic idea of Schwarz (1978) and develop a generalized Bayesian information criterion for regression model selection. The new criterion relaxes the usually strong distributional assumption associated with Schwarz's BIC by adopting a Wilcoxon-type dispersion function and appropriately adjusting the penalty term. We establish that the Wilcoxon-type generalized BIC preserves the consistency property of Schwarz's BIC without its need to assume a parametric likelihood. We also show that it outperforms Schwarz's BIC with heavier-tailed data in the sense that asymptotically it can yield substantially smaller L_2 risk. On the other hand, when the data are normally distributed, both criteria have similar L_2 risk. The new criterion function is convex and can be conveniently computed via existing statistical software.