

## Stein's method and the influence of the prior in Bayesian statistics

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Joint work with Gesine Reinert (Oxford) and Christophe Ley (Ghent)

We propose tight upper and lower bounds for the Wasserstein distance between any two univariate continuous distributions with probability densities  $p_1$  and  $p_2$  having nested supports. These explicit bounds are expressed in terms of the derivative of the likelihood ratio  $p_1/p_2$  as well as the Stein kernel of  $p_1$ . The method of proof relies on a new variant of Stein's method which manipulates Stein operators. We give several applications of these bounds. Our main application is in Bayesian statistics : we derive explicit data-driven bounds on the Wasserstein distance between the posterior distribution based on a given prior and the no-prior posterior based uniquely on the sampling distribution. This is the first finite sample result confirming the well-known fact that with well-identified parameters and large sample sizes, reasonable choices of prior distributions will have only minor effects on posterior inferences if the data are benign.

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