

7 Bayesian testing for embedded hypotheses with application to shape constraints

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If Bayesian nonparametric methods have received a great interest in the literature, only a few is known for testing nonparametric hypotheses, and especially the asymptotic properties of such tests. The problem of testing between two nonparametric hypotheses is known to be difficult, but the problem becomes even harder when the hypotheses are embedded. In this work, we propose a method to circumvent these difficulties with a special focus on shape constraints testing. We propose an approach that allows us to derive a Bayesian answer to testing problems that have good asymptotic properties and is easy to use in practice. Furthermore, from our method, we can easily derive posterior separation rate for the tests. To our best knowledge, this particular aspect of the test has not been studied in the Bayesian literature so far. We apply our approach to several testing problems with a special attention to the problems of testing for positivity or monotonicity in a nonparametric regression problem.