

# Asymptotic properties of parallel Bayesian kernel density estimators

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**Abstract** In this article, we perform an asymptotic analysis of Bayesian parallel kernel density estimators introduced by Neiswanger et al. (in: Proceedings of the thirtieth conference on uncertainty in artificial intelligence, AUAI Press, pp 623–632, 2014). We derive the asymptotic expansion of the mean integrated squared error for the full data posterior estimator and investigate the properties of asymptotically optimal bandwidth parameters. Our analysis demonstrates that partitioning data into subsets requires a non-trivial choice of bandwidth parameters that optimizes the estimation error.

**Keywords** Density estimation · Asymptotic properties · Parametric optimization · Parallel algorithms

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