

Title:

**Parameter Estimation in Hidden Markov Models with General State Spaces**

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Abstract:

Efficient estimation of the parameters of hidden Markov models has been a long-standing problem because of the analytic intractability and computational complexity of the likelihood function when the state space is infinite and the stochastic system is not a linear Gaussian model. To overcome these difficulties, we first develop information bounds by considering more tractable estimation problems in which the states of the underlying Markov chain are observed periodically. We then develop pseudo-likelihood estimators that are analytically and computationally tractable, and show that they attain the information bounds and are therefore asymptotically efficient. Applications to stochastic volatility modeling, together with implementation details and simulation studies, are given.