

Confidence Regions for Stochastic Approximation Algorithms

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In principle, known central limit theorems for stochastic approximation schemes permit the simulationist to provide confidence regions for both the optimum and optimizer of a stochastic optimization problem that is solved by means of such algorithms. Unfortunately, the covariance structure of the limiting normal distribution depends in a complex way on the problem data. In particular, the covariance matrix depends not only on variance constants but also on even more statistically challenging parameters (e.g. the Hessian of the objective function at the optimizer). In this paper, we describe an approach to producing such confidence regions that avoids the necessity of having to explicitly estimate the covariance structure of the limiting normal distribution. This procedure offers an easy way for the simulationist to provide confidence regions in the stochastic optimization setting.