

There has been considerable development of distributed adaptive algorithms in recent years with diffusion algorithms offering very attractive features, but their performance analysis has been severely limited in two ways. First, since the algorithms operate in real time, stability analysis must be done realization-wise but there are no such results. Second, almost all analyses to date assume white regressors, whereas, in practice, this is rare. In this paper, we remedy these limitations using stochastic averaging analysis methods. The key to the analysis is the recognition, for the first time, that the associated error systems have a mixed time-scale structure. Simulations illustrate the new results.