RATES FOR NONPARAMETRIC MAXIMUM-LIKELIHOOD ESTIMATION OF LOG-CONCAVE DENSITIES

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Testing that an arbitrary mixture of log-concave densities is in fact just a single log-concave density is an appealling way of testing the so-called quantal hypothesis for neurotransmitter release at synapses. A multiscale testing procedure of this hypothesis is presented in Walther (2002). A key step in that procedure is the estimation of a log-concave density by nonparametric maximum likelihood. Some results on the performance of such estimators in the one-dimensional case have appeared, however we present some new results and conjectures regarding the rate of convergence to zero of the Hellinger distance between the estimate and the true underlying log-concave density. In particular we sketch how one might prove that the rate of convergence to zero of the mean integrated squared error in one, two or three dimensions coincides with that obtained when using a kernel density estimate using the optimally chosen bandwidth.