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Eigenvalues of Hermite and Laguerre ensembles: Large Beta Asymptotics

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In this paper we examine the zero and first order eigenvalue fluctuations for the β-Hermite and β-Laguerre ensembles, using the matrix models we described in \cite{dumitriu02}, in the limit as $\beta \to \infty$. We find that the fluctuations are described by Gaussians of variance $O(1/\beta)$, centered at the roots of a corresponding Hermite (Laguerre) polynomial. We also show that the approximation is very good, even for small values of β, by plotting exact level densities versus sum of Gaussians approximations.