We define the spectral and the nuclear norm of a homogeneous polynomial \( f \) of degree \( d \) in \( n \) variables, over real or complex numbers, as the maximum of the absolute value of \( f \) on the unit sphere, and the minimum “energy” of the decomposition of \( f \) as a sum of powers of linear forms. We show that for a fixed \( n \) the spectral and nuclear norms can be approximated polynomially in \( d \). These results imply that the entanglement of symmetric tensors and the separability of symmetric density tensors can be compute polynomially in \( d \) for a fixed \( n \). The proof uses recent results of Friedland-Lim, Friedland-Wang and Derksen-Friedland-Lim-Wang. (Received August 14, 2018)