Quantum Complexity of the Integration Problem for Anisotropic Classes

摘要
关键词

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Abstract We obtain the optimal order of high-dimensional integration complexity in the quantum computation model in anisotropic Sobolev classes $W_{\infty}^{\bf r}([0,1]^d)$ and Hölder Nikolskii classes $H_{\infty}^{\bf r}([0,1]^d)$. It is proved that for these classes of functions there is a speed-up of quantum algorithms over deterministic classical algorithms due to factor n^{-1} and over randomized classical methods due to factor $n^{-1/2}$. Moreover, we give an estimation for optimal query complexity in the class $H_{\infty}^{\Lambda}(D)$ whose smoothness index is the boundary of some complete set in $\mathbb{Z}_+^d$.

Key words   Quantum computation   Integration problem   Anisotropic classes   Complexity

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