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Yulong Lu
Min Wang</td></tr>
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<tr><th>abstract</th><td>This paper concerns the a priori generalization analysis of the Deep Ritz Method (DRM) [W. E and B. Yu, 2017], a popular neural-network-based method for solving high dimensional partial differential equations. We derive the generalization error bounds of two-layer neural networks in the framework of the DRM for solving two prototype elliptic PDEs: Poisson equation and static Schr\"odinger equation on the d-dimensional unit hypercube. Specifically, we prove that the convergence rates of generalization errors are independent of the dimension d, under the a priori assumption that the exact solutions of the PDEs lie in a suitable low-complexity space called spectral Barron space. Moreover, we give sufficient conditions on the forcing term and the potential function which guarantee that the solutions are spectral Barron functions. We achieve this by developing a new solution theory for the PDEs on the spectral Barron space, which can be viewed as an analog of the classical Sobolev regularity theory for PDEs.</td></tr>
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