Deep Ritz Method for Optimization with Elliptical Constrains

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In this article, we propose a novel approach to address optimization problems with elliptical constraints using neural networks. Our method is based on the augmented lagrange algorithm and the Deep Ritz Method. To demonstrate the effectiveness of our approach, we consider two numerical examples: the inverse source problem and boundary control problem, both of which are challenging tasks for finite element methods (FEM) in high dimensional space due to the curse of dimensionality. Furthermore, we provide a convergence analysis of our method to enhance its practicality.