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A study of the single-layer ReLU neural network

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In this talk, we are concerned with the single-layer ReLU neural network. In particular, the traditional linear finite element method (FEM) can be regarded as a special case of this neural network. Via the optimization method, we developed an adaptive FEM which is efficient for approximating singular functions as well as smooth functions. Based on the adaptive FEM, we proposed a finite element neural network (FENN) for regression. The numerical experiments verify the high efficiency of the FENN regression. Furthermore, we applied the adaptive FEM to solve a singularly perturbed problem which established the foundation of the related FENN for solving the differential equation. of the related FENN for solving the differential equation.