Abstract

Estimation of multivariate regression functions from bounded i.i.d. data is considered. The L_2 error with integration with respect to the design measure is used as an error criterion. The distribution of the design is assumed to be concentrated on a finite set.

Neural network estimates are defined by minimizing the empirical L_2 risk over various sets of feed-forward neural networks. Approximation properties of neural networks are investigated, and nonasymptotic bounds on the L_2 error of the estimates are derived. The results indicate that neural networks are able to adapt to additive regression functions and to regression functions which are a sum of ridge functions, and hence are able to circumvent the curse of dimensionality in these cases.