

Optimal Approximation of Neural Networks and Non-affine Systems

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Abstract

Due to the increasing significance of Deep Learning, the study of neural networks have recently become a main focus in academic research. In order to gain a thorough understanding of their approximation abilities, extensive study on the network structure achieving desired approximation properties for given function classes is essential. In particular, we are interested in optimizing complexity and memory requirements of the considered networks.

Based on the approximability of affine systems by deep neural networks, fundamental lower bounds on the connectivity and memory requirements were proved for networks that attain approximation rates for function classes, which can be optimally approximated by affine systems. In our talk, we will follow this approach to acquire a similar result regarding the non-affine system Bendlets. We remark that we restrict ourselves to ReLU neural networks.