

Integral Transforms Induced by Neural Networks

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Abstract: Integral transformations (such as Fourier, Gabor or Radon) play an important role in applied science. Also functions computable by neural-network units can be used as kernels of integral transforms. Combining properties of such integral transformations with tools from nonlinear approximation theory, we investigate model complexity of neural networks. For a wide class of functions we derive estimates of rates of approximation by networks with an increasing number of units. We show that such rates depend on the "magnitude" of a weight function in an integral representation in the form of a neural network with infinitely many units.

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