

Using linear Legendre wavelet in a synapses neural network

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Abstract. Wavelet neural networks are a new class of networks that combine the classic neural networks and the wavelet analysis. In this study for the first time, linear Legendre wavelet is used to construct a wavelet synapses neural network in order to approximation simplefit data set. By finding weight matrix, our neural network will be trained and finally we will test our network.

1. Introduction

In the late 19th and early 20th centuries a few preliminary studies about neural networks (NN) were started. They dealt with some scientific topics like physics, psychology and the like. In the 1940s, Warren Mcculloch and Walter Pitts started to use NN as it is use today [9]. They showed that the NN can compute all sorts mathematical or logical functions [8]. Later Donald Hebb proposed a mechanism describing learning in live neurons [4]. The first usage of networks appeared in the 1950s when Frank Rosenblatt and others created perceptron networks. Rosenblatt also wrote a book on neurocomputing entitled " Principles of Neurodynamics" [10]. During the 1980s, John Hopfield became interested in NN and wrote two important papers on NN [5, 6]. At this time, by describing the concept of the usage of statistics in recurrent neural networks, research on neural networks gained new impetus, and new concepts emerged. Since approximation of continuous functions by networks is very useful in the modeling systems and due to the similarities of wavelet transforms and NN, the idea of matching them was introduced [11]. Although the applications of wavelet in small dimension is very good, wavelet neural networks can analyse problem with large dimension [12]. Some basis functions like spline, polynomial and radial are used as activation function in different kinds of NN. For the first time, Boubez and Peskin used wavelet basis in the NN [2]. They used orthonormal wavelet basis in NN and showed that network weight can be obtained directly and independently. So far, numerous articles on neural networks have

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