

The performance of two mothers wavelets in function approximation.

ABSTRACT

Research into Wavelet Neural Networks was conducted on numerous occasions in the past. Based on previous research, it was noted that the Wavelet Neural Network could reliably be used for function approximation. The research conducted included comparisons between the mother functions of the Wavelet Neural Network namely the Mexican Hat, Gaussian Wavelet and Morlet Functions. The performances of these functions were estimated using the Normalised Square Root Mean Squared Error (NSRMSE) performance index. However, in this paper, the Root Mean Squared Error (RMSE) was used as the performance index. In previous research, two of the best mother wavelets for function approximations were determined to be the Gaussian Wavelet and Morlet functions. An in-depth investigation into the two functions was conducted in order to determine which of these two functions performed better under certain conditions. Simulations involving one-dimension and two-dimension were done using both functions. In this paper, we can make a specifically interpretation that Gaussian Wavelet can be used for approximating function for the function domain $[-1, 1]$. While Morlet function can be used for big domain. All simulations were done using Matlab V6.5.

Keyword: Neural network; Wavelet neural network; Function approximation; Morlet function; Gaussian wavelet function