Noise cancelation in time series example from Magnetotelluric Method

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Interpretation in natural-source magnetotelluric (MT) method begins with the time series analysis for enhancement signal-to-noise ratio of nonstationary electromagnetic data. First step of time series analysis is manual editting the data contaminated with some noise. However reducing the noise, by manually editing, to acceptable level in data for each channel is a time consuming process. It should also be noted that subjective results are often generated by using manually editting. For this reasons artificial neural network (ANN) techniques have been used for time series analysis recently.

This work is focused on a technique for automatic classification of MT time series data by using ANN. For this aim, three-layer feed-forward artificial neural network was designed. The Neural networks have some advantages over traditional techniques the back-propagation algorithm was used in this application for network training. Synthetic data base consists of various noises and signal pattern was produced and used as an input to the ANN for training and testing the network. After reaching pre-estimated level of error parameter, training was stopped. Then these "knowledge" were used to clean the experimental data. Our test applications indicated that if the ANN trained with adequately selected training database.ANN classified the observed data correctly. Lesser layer and inadequate sample in database causes erratic classification.