

A method for adapting feed-forward neural networks is proposed. The technique handles multi-input multi-output neural networks and is a generalization of previous research results presented in [1] where adaptation of single output feed-forward neural networks was developed. The artificial neural net (ANN) is trained with historical time series input-output process data. Once trained, the ANN forecasts the process outputs in the future. It is assumed that the ANN is linear in the output weight matrix and bias vector which are parameters of the net. This linearity property allows the use of the Kaczmarz's projection algorithm for updating the individual output weight vectors and biases on-line to improve the prediction accuracy. The algorithm uses the errors between the outputs measurements and the predicted outputs values to update the network's parameters recursively. The method's capability is demonstrated through computer simulation on the breathing process in camless internal combustion engines. The adaptive ANN can improve the performance of an ANN based camless engine inverse controller.