

# Comparing Different Optimization Error Functions in An Artificial Neural Network For Exchange Rate Forecasting Models

Benjamin Zarate-Carbajal<sup>1</sup>, Ángel Samaniego-Alcantar<sup>2</sup>, José L. Chávez-Hurtado<sup>3</sup>

Instituto Tecnológico y de Estudios Superiores de Occidente (ITESO), Mexico

## Abstract

The most common optimization factor used in Artificial Neural Networks (ANN) is Mean Square Error (MSE). During this research, we propose a different approach for error function to optimize the models: adjusted mean square error (AMSE), adjusted mean absolute error (AMAE) and Correct Price Percentage (CPP). We will create an ANN exchange rate forecasting model using different performance functions, where we will be comparing our proposed error functions: CPP, AMAE and AMSE, against the traditional error functions: MSE, mean absolute error (MAE), sum absolute error (SAE), sum squared error (SSE) and cross-entropy (CE). We will measure the errors of the models using CPP and MSE as metrics. One of the goals of a models, is not only predict the exchange rate, also create a profit, in this sense, any performance functions should take into consideration the lower and higher bands of the currency prices within the day. The models are more profitable, for those cases where we calculated ANN's performance functions by considering as error the values out of the band (CPP, AMAE and AMSE). Using optimization factors which consider as errors any value outside the lower and higher band, provides better forecasting models from the profitability point of view.

**Keywords:** Optimization methods, error functions, Artificial Neural Networks