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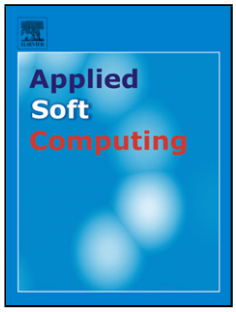

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Trend following in financial time series with multi-objective optimization

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Abstract

Trend following (TF) is an investment strategy based on the technical analysis of market prices. Trend followers do not aim to forecast nor predict specific price levels. They simply jump on the uptrend and ride on it until the end of this uptrend. Most of the trend followers determine the establishment and termination of uptrend based on their own rules. In this paper, we proposes a TF algorithm which employs multiple pairs of thresholds to determine the stock market timing. The optimal values of thresholds are obtained by Particle Swarm Optimization (PSO) and Simulated Annealing (SA). The experimental result on 7 stock market indexes shows that the proposed multi-threshold TF algorithm with multi-objective optimization is superior when it is compared to static, dynamic, and float encoding genetic algorithm based TF.

Keywords: financial time series, technical analysis, trend following, Particle Swarm Optimization, Simulated Annealing

1. Introduction

It is believed that the future behavior can be predicted by studying the past behaviors. This theory is the cornerstone for many application domains. For instance, meteorologists forecast weather based on the analysis of past climate data. This theory can also be applied in financial trading. Financial markets are complex dynamic systems with a high number of active agents (investors, traders and hedgers), influenced by each other and by external information (news, economic data, events). This produces a behavior with high randomness and noise which is very difficult to predict [1]. Thus, various tools and methods have been developed to help investors study these behaviors in financial markets. These studies are very useful for predicting future movements. In financial trading, there are two basic types of analysis - fundamental and technical. Fundamental analysis is a methodology of evaluating a security by attempting to measure its intrinsic value by examining related economic, financial and other qualitative and quantitative factors [2]. Fundamental analysis attempts to study all of related factors that can affect the security's value. Therefore, it is an arduous task to find as

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