

# Multivariate Forex Calculus Robot

## User Manual

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for Alice

## **INTRODUCTION**

The Calculus Robot was developed as an example of an approach to Time Series Data Analysis and Forecasting.

Computers have an advantage over humans in the manner that they can perform millions of operations within a second, which is why chosen is an approach to analyze all possible symbols, and designed algorithms were created to facilitate that, instead of focusing on some specific instruments.

All mathematics and physics used in Calculus Robot is at a High School level or mostly in the first year of studies at a Technical University.

It is put into practical application in terms of Computer Science and Programming. It should be relatively accessible for developers worldwide to continue to develop and expand the Robot and its algorithms.

## **ROBOTS DEFAULT CONFIGURATION**

Robot in its default configuration besides "Method" has enabled algorithms: "Method A", "Method B", "Method E", and "Method F".

In Mathematics there is a topic known as "examination of the course of function variability" which involves determining the local minima and maxima of a given function and determining its graph. In "Method" there is implemented such approach, which utilizes by examining in a numerical sense change of values of function and in this way determining local minimas and maximas. The rest of the Robot's algorithms are based on analyzing these local minima and maxima, which allow to elimination of any noise in the data.

"Method A" and "Method B" use Backpropagation FeedFoward Neural Networks to determine if to proceed with Trade.

"Method E" involves calculating the speed of the Robot making money or losing money and keeping that in the specified range.

"Method F" uses past values of Instruments, saved during Robot's work to determine similar past situations to current market conditions and by that to decide if to proceed with a trade or not. For this method to be activated Robot has to work at least for two weeks.

The average Trade length placed by a Robot is around 10-12 hours. After analyzing Robot results for like two months or more it can be seen that Robot tends to be in switching periods between making money and losing money that lasts for a couple of days or even weeks.

## **MODIFYING ROBOT PARAMETERS AT RUNTIME**

In the directory "Files" after execution of the Robot file "ConfigurationVariables.txt" is created. That file contains parameters that govern the work of Robot and can be changed during Robot's work. Most important are two parameters "LotSize" and "ReverseTrades".

In Robots execution, all placed trades are symmetrical, for every placed trade there are specified values of "Stop Loss" and "Take Profit", delta values of these variables are equal. If the Sell operation failed then symmetrical to it Buy operation with properly switched values of "Stop loss" and "Take Profit" would be successful.

Flag "ReverseTrades" specifies whenever to proceed to change to the opposite trade at the last moment, just before placing a trade.

## **BACKTESTER**

Robot during its work creates in the "Files" directory file "FarPastData.txt" to which every minute are written the current values of all Instruments. That file can be used with Backtester to perform backtesting of a Robot's performance for data from a specific Broker.

After running Robot for at least two months, backtesting can be performed for different values of Robot's parameters specified in file "Config.h".

When the backtest is performed it will be generated in the directory "Files" file "Closed\_Trades.txt" all trades realized during Backtesting with its results.

That file can be fed to the application from the Tools directory named "MethodGCalculator", with that application can calculate values of "MultivariateSurfingReverseBalanceSpeedMin" and "MultivariateSurfingReverseBalanceSpeedHours" for the "ConfigurationVariables.txt" file.

When MethodG is turned on in "Config.h" those parameters govern its work by properly reversing trades when it is detected that the Robot enters the period in which it will be losing money. Those parameters are calculated for LotSize equal to 0.01, if changing the Lot size then the parameter "MultivariateSurfingReverseBalanceSpeedMin" has also to be proportionally changed.

## **WHY CALCULUS ROBOT IS BEEING DEVELOPED**

There are Stock Market's Investors, that kind of investors search for opportunities to invest their money in some kind of Enterprise in order to make profit. Such Investor predicts that the value of shares of particular Company listed in any given Stock Market will increase. Let's assume that such investor has correctly predicted that the value of shares of particular Company will increase. That means that this Company in its business will be doing something that is beneficial to the Society.

That Company will be selling some products or providing some services that People need and People are paying for that product/service and that is why value of shares of that Company increases. When investor invest their money in that Company, that Company has more money so it can do even better that needed for Society business that it is already doing. When Investor makes money on Stock Market Investments than the rest of the Society has some kind of the benefit. Calculus Robot is being developed in order to give Investors some kind of tool that will increase their productivity.