

Expert MT4

YY Renko Random Robot

User's guide

English edition



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YY Renko Random Robot

This Expert Advisor belongs to the "almost Grail" category. What does this mean? This means that this EA makes it possible to trade profitably in almost any trading situation (with the exception of a very specific and rare situation, which will be considered separately below). The words "any trading situations" mean not only standard things (such as a trend or flat), but also any other patterns and/or figures, including the most unexpected and "arty-crafty", and which do not even have names in the framework of traditional technical analysis. This is not an unfounded statement: below in the text we will show specific examples of the profitable work of this Expert Advisor on a variety of patterns (both standard and not so).

But first things first. First of all, it is highly recommended to read the description of the free indicator "**YY Line of Renko on the Chart**" [\[link\]](#), on the basis of which this Expert Advisor is built. After this introduction, many things will become clear, which will be discussed below.

* * *

So, if you have already read the description of this indicator, then you should know the following:

- it is convenient to represent price movements in the form of a stepped line (Renko chart);
- the movement of the market differs little from a random discrete walk;
- despite the randomness of these price movements, there are four main Patterns (two trending and two flat) that occur most often;
- depending on the success of working with these four Patterns, each expert can be assigned to one of four groups: "not Grail", "semi Grail", "almost Grail", "pure Grail";
- this expert belongs to the category "almost Grail" according to formal features.

General characteristics and nuances

Monopolness. This Expert Advisor works only in exclusive mode. This means that this expert should work in the MT4 terminal in a single instance.

Before launching this Expert Advisor, you should make sure that there is not a single working Expert Advisor in the MT4 terminal and there is not a single active market or pending order.

If this Expert Advisor is in operation, then it is strictly not recommended to launch any other Expert Advisors or duplicate instances of the same Expert Advisor. It is also not recommended to perform any trading operations in manual mode (opening, modifying or closing positions or market orders; placing, modifying or deleting pending orders, etc.).

Also, during the operation of this Expert Advisor, it is strictly not recommended to change the current account, as well as change the instrument and/or timeframe of the chart on which this Expert Advisor is installed.

Monocurrencyness. This Expert Advisor works with only one instrument (currency pair), on the chart of which it is installed.

Tools. This Expert Advisor was used and tested on the Forex market on the following currency pairs:

- EURUSD, GBPUSD, USDCHF.

However, this EA is so "omnivorous" (in terms of the behavior of the market it works on: trendy, flat, mixed, chaotic, random, etc.) that it can be used on almost any instrument. The main thing is that this instrument should have sufficiently large liquidity and volatility.

Timeframes. This expert works on any timeframe in exactly the same way. The fact is that for its work the built-in Renko indicator is used, which relies not on the candlestick chart, but on the current flow of ticks, which is independent of the timeframe. Thus, the Expert Advisor can be installed on any timeframe, but for greater clarity, it is recommended to install it on the smallest (minute) timeframe M1.

Spreads and commissions. This Expert Advisor can work with a floating spread. But it is desirable that both the spread and commissions are as small as possible.

Grids and pyramids. This Expert Advisor can work even on a randomly wandering market. And in such a market, the correct and competent application of probability theory and mathematical statistics plays a very important role. So, these disciplines suggest that the use of single orders in such a market is ineffective. The more simultaneously open orders (within reasonable limits), the more efficient the trade will be.

This EA uses an ordered mass of orders arranged in a grid. And any grid of orders is inevitably a pyramid. (For this Expert Advisor, the words "order grid" and "order pyramid" are synonymous.) Three types of grids/pyramids are used in the Expert Advisor:

- soft trend - anti-trend pyramid;
- soft flat - anti-flat pyramid;
- hard trend - flat pyramid.

Here, the word "soft" means that in the course of operation, orders can be added to or removed from the pyramid. The word "hard" means that orders can only be added to the pyramid, but not removed.

The word "trend" means that orders in the pyramid are placed in the direction of the trend.

The word "anti-trend" means that orders in the pyramid are placed in the direction against the trend.

The word "flat" means that orders in the pyramid are placed in the direction from the channel borders to its center.

The word "anti-flat" means that orders in the pyramid are placed in the direction from the center of the channel to its borders.

Trading Cycle and Target Profit Factor. Usually, probability theory considers infinite random walk processes. Some formula is taken (for example, the profit factor formula) and it looks like it will behave at infinity (i.e. with an infinite number of random price movements). In particular, for a soft anti-trend pyramid (among casino fans such a pyramid is known as the "Donald – Nathanson System"), the theoretical profit factor at infinity is equal to $\pi/2$, i.e. approximately 1.571.

This, of course, is good. But experience shows that trading "to infinity" is, to put it mildly, impractical. It is much more reasonable to restart the trading process from time to time immediately after reaching a certain acceptable value of the profit factor.

Thus, in this Expert Advisor, trading is carried out in discrete Trading Cycles. After reaching a certain target value of the profit factor (which is set by the user in the settings), the Trading Cycle ends and all orders are closed. After that, a new Trading Cycle begins almost immediately.

Parameters

- **Magic Number** – "magic" expert number;
- **Grid Step (in points)** – order grid step, corresponds to the 'Step of Levels in points' parameter of the "Line of Renko on the Chart" indicator;
- **Grid Shift (in points)** – order grid shift, corresponds to the 'Shift of Levels in points' parameter of the "Line of Renko on the Chart" indicator;
- **Amount of Lots** – the number of lots used when placing orders; this number is additionally multiplied by one of the coefficients (**Ktat**, **Kfaf** or **Ktf**), which are described below;

- **Max Slippage (in points)** – the maximum allowable slippage when placing market orders; if the actual amount of slippage is greater, then the attempt to place an order will continue until the slippage exceeds this maximum allowable value;
- **Max Spread (in points)** – the maximum allowable spread; if the current spread value is greater than specified in this parameter, then measures are taken to limit the work of the Expert Advisor in such unfavorable conditions;
- **Ktat (Factor of the trend-antitrend 'soft' component)** – coefficient by which the 'Amount of Lots' value (see above) is multiplied to calculate the position volume for each of the orders included in the soft trend - anti-trend pyramid; if this coefficient is positive, then the expert will build a trend pyramid; if this coefficient is negative, then the expert will build an anti-trend pyramid; if this coefficient is set to zero, the Expert Advisor will not create a pyramid of this type (*);
- **Kfaf (Factor of the flat-antiflat 'soft' component)** – coefficient by which the 'Amount of Lots' value (see above) is multiplied to calculate the position volume for each of the orders included in the soft flat - anti-flat pyramid; if this coefficient is positive, then the expert will build a flat pyramid; if this coefficient is negative, then the expert will build an anti-flat pyramid; if this coefficient is set to zero, the Expert Advisor will not create a pyramid of this type (*);
- **Ktf (Factor of the trend-flat 'hard' component)** – coefficient by which the 'Amount of Lots' value (see above) is multiplied to calculate the position volume for each of the orders included in the hard trend - flat pyramid; if this coefficient is positive, then the expert will build a trend pyramid; if this coefficient is negative, then the expert will build a flat pyramid; if this coefficient is set to zero, the Expert Advisor will not create a pyramid of this type (*);
- **Target Profit Factor for Trading Cycle (off if PF<=1)** – target profit factor, upon reaching (or exceeding) which the current Trading Cycle will be completed; if you set this parameter to less than or equal to one, then this means that this parameter is disabled: i.e. its value is not taken into account, and the current Trading Cycle will not be interrupted (in this case, it can only be interrupted manually);
- **Mode of EA on restart** – can take one of two values:
 - *Start_New_TradeCycle* – when the Expert Advisor is restarted, it will "forget" all information about the previous Trading Cycle and start its work "from blank sheet", i.e. will launch a new Trading Cycle;
 - *Continue_Previous_TradeCycle* – when the Expert Advisor is restarted, it will continue working with the previous Trading Cycle; it is strongly recommended to use this option;
- **Permanent data saving** – if this parameter is set to *true*, then the data on the current Trading Cycle will be saved to disk at the slightest change in the state of the Expert Advisor or the Trading Cycle; if this parameter is set to *false*, then the data on the current Trading Cycle will be saved to disk only when the Expert Advisor is removed from the chart or when it is restarted; it is recommended to use the *true* option, since it allows to ensure uninterrupted operation of the Expert Advisor in the event of a short-term loss of connection and/or power supply;
- **If a Fatal Error is detected, then...** – can take one of two values:
 - *TradeCycle_Restart* – if a fatal error occurs, the current Trading Cycle will be terminated;
 - *TradeCycle_Continue* – if a fatal error occurs, the current Trading Cycle will continue, but the actions that caused the error will be temporarily stopped; it is recommended to use this option, since it significantly increases the stability of the Expert Advisor;

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- **Sounds** – can take one of two values:
 - *off* – sound signals are not given by the expert;
 - *on* – sound signals are given by the expert for two types of events:
 - 1) event <formation of a new "macrotick"> – an **alert.wav** signal is sent;
 - 2) event <end of the Trading Cycle> – **alert2.wav** signal is sent;
- **End the Trading Cycle manually** – this is not even a parameter, but a reminder to the user that the current Cycle can be manually terminated by pressing the <Ctrl_J> key combination; Attention! Before using this keyboard shortcut, you need to left-click on any empty place on the chart on which this Expert Advisor is installed;
- **Remove Expert correctly** – this is also "not a parameter"; this is a reminder to the user that using the keyboard shortcut <Ctrl_Q>, you can correctly remove the expert from the chart with the preliminary deletion of all orders that were placed by him; Attention! Before using this keyboard shortcut, you need to left-click on any empty place on the chart on which this Expert Advisor is installed.

(*) If all three parameters (**Ktat**, **Kfaf**, **Ktf**) that determine the construction of three types of order pyramids are set to zero, then the Expert Advisor will not trade.

Formal "almost Grail"

This Expert Advisor belongs to the class of "almost Grails" on purely formal grounds.

1st sign: the EA shows a positive result on all (!) Patterns shown on slide 1. The Patterns shown in the first line of this slide conventionally belong to the category of "simplest Patterns". And the Patterns shown in the second line belong to the "simple" category.

2nd sign: the expert shows a positive result on almost all (!) "complex Patterns" of arbitrary form. An example of such Patterns is shown on slides 12A and 12B.

Below, on slides 2 – 12, the work of this Expert Advisor on each of these Patterns will be considered in more detail.

Important note #1. Everything that is said in this section and also in the following sections applies to this Expert Advisor only if it has the following parameter settings:

Ktat = -1; **Kfaf** = -2; **Ktf** = +5;

Target Profit Factor for Trading Cycle = 1.001;

If a Fatal Error is detected, then... = *TradeCycle_Continue*.

Any other combination of these parameters can lead to a significantly different behavior of the Expert Advisor, due to which it can no longer be classified as "almost Grail".

Important note #2. This EA does not try to recognize which of the Patterns shown on slide 1 is being formed in the market at the moment. The EA works with all these Patterns in the same way, according to the same rules. At the same time, the resulting financial result will be different for different Patterns, but it will (ultimately) be positive for each of them.

"Almost Grail" work with the simplest Patterns

The work of the Expert Advisor with the simplest Patterns in a general (schematic) form is shown on slide 2.

Work on Pattern #+10. Slide 2 for this Pattern shows the level grid in the form of thin dotted horizontal lines. Based on these levels, the Renko indicator is built, which is shown on slide 2 as a thick solid line. The price movement line is not shown here because the Renko line alone is enough to explain the operation of the Expert Advisor. And the price movement line will only clutter up the drawing without displaying any new useful information.

Here it is worth a little stop on the terminology. Let's consider such concepts as "macrotick", "macropoint", "price of a macropoint".

"Macrotick" is the price movement from one level to another neighboring level in any direction.

"Macropoint" is the distance traveled by the price for one "macrotick". In fact, the value of one "macropoint" is equal to the step of grid, on the basis of which the Renko line is built. Its value is set in points in the **'Grid Step'** parameter of this EA.

"Macropoint price" is the amount, expressed in money, that you will gain (or lose) if the price changes by the amount of one "macropoint". This is an analogue of the term "point price". To calculate the "macropoint price", multiply the "point price" for this instrument by the number of points specified in the **'Grid Step'** parameter. For example, it is common knowledge that for the EURUSD and GBPUSD instruments (at five-digit quotes and with a position size of \$10,000) the "point price" is \$0.1. If the **'Grid Step'** is 100 pips, then the "macropoint price" is $\$0.1 * 100 = \10 .

You can adjust the "price of a macropoint" using the **'Amount of Lots'** parameter of this Expert Advisor. If you set this parameter to 0.1, then for this Expert Advisor it will mean the size of the each opened positions in the amount of \$10,000. (This is the case if your broker's standard lot size is \$100,000. Then the position size will be $\$100,000 * 0.1 = \$10,000$.) This means that for this EA the "macropoint price" (as calculated above) will be equal to \$10.

But let's get back to working on Pattern #+10. As mentioned above, this Expert Advisor works with Trading Cycles. As soon as the target profit factor (which is set in the **'Target Profit Factor for Trading Cycle'** parameter of this Expert Advisor) is reached (or exceeded), the Trading Cycle will be completed. Of course, with a profit.

From the picture presented on slide 2, it can be seen that only two "macroticks" are enough for an Expert Advisor on this Pattern to complete the Trading Cycle. At the end of this Cycle, some orders will be closed in "plus", and some – in "minus". The overall result will be as follows:

- orders closed with a "plus" will bring a profit equal to 9 "macropoints" (this value is called Gross Profit or GP);
- orders closed with a "minus" will bring a loss equal to 5 "macropoints" (this value is called Gross Loss or GL);
- net profit (Net Profit or NP) will be equal to $NP = GP - GL = 9 - 5 = 4$ "macropoints";
- theoretical profit factor (TPF) will be equal to $TPF = GP/GL = 9/5 = 1.8$.

Here the question may arise: where did these numbers come from? Why are they like this? The fact is that these numbers are the result of the work of several pyramids that are part of the Expert Advisor. In this case, these are "soft" anti-trend and anti-flat pyramids, as well as a "hard" trend pyramid. The orders included in these pyramids have different volumes and directions of trades. The calculation of the results of the work of these pyramids is carried out in several stages according to rather cumbersome formulas (several text pages in volume). In addition, the derivation and explanation of these formulas (i.e., the explanation of why these particular formulas work, and not any others) takes several dozen more text pages. As you understand, it is simply impossible to do this within the framework of this brief description of the Expert Advisor.

For now, you can take our word for it that the profit / loss numbers are exactly that. A little later you will be convinced of their correctness in practice. (How to do this will be discussed below.)

Concluding the review of the Expert Advisor's work on Pattern #+10, you should pay attention to the following. As this Pattern forms, the Expert Advisor will consistently enter more and more new Trading Cycles. Moreover, each of these Cycles lasts exactly two "macroticks" during which the price rises by two "macropoints". And each of these Cycles will bring a net profit of 4 "macropoints". The longer this Pattern lasts, the greater the total profit will be. For example,

slide 2 shows a section of this Pattern with a duration of 6 "macroticks". During this time, 3 Trading Cycles will be completed, which will bring a total of 12 "macropoints" of profit.

Working on Pattern #-10 is no different from working on Pattern #+10. Despite the fact that these Patterns have the opposite price direction relative to each other, this does not matter to the expert. It will show exactly the same result on each of these Patterns: 4 "macropoints" of net profit in one Trading Cycle.

Working on Pattern #11. Strange as it may seem, the EA also shows a positive result on this Pattern. Although there are differences in work. In particular, the Trading Cycle here lasts three "macroticks" (rather than two as in the previous Patterns). The result of the Expert Advisor's work for one Trading Cycle is as follows:

- orders closed with a "plus" will bring a profit equal to 5 "macropoints";
- orders closed with a "minus" will bring a loss equal to 2 "macropoints";
- net profit (Net Profit or NP) will be equal to $NP = GP - GL = 5 - 2 = 3$ "macropoints";
- theoretical profit factor (TPF) will be equal to $TPF = GP/GL = 5/2 = 2.5$.

As can be seen from these data, the profit per one Trading Cycle on this Pattern is somewhat less than on the previous Patterns (3 "macropoints" versus 4). But the profit factor is higher (2.5 vs. 1.8).

Illustration of "almost Grail" work with simplest Patterns

Slides 3 – 5 show how the Expert Advisor works with Patterns #+10, #-10 and #11 on the price chart. For clarity, these charts have a Renko indicator chart (LRC – Line of Renko on the Chart), on the basis of which this Expert Advisor works. Note that the presence of this indicator on the chart is not necessary for the Expert Advisor to work.

Also, these slides show the start and end points of the Trading Cycles. Moreover, the designations of the points on slides 3 – 5 coincide with the designation of the same points on slide 2. You can compare them. And this is no coincidence. The fact is that slide 2 shows a "theoretical" image of the Patterns in question. And on slides 3 – 5 the same Patterns are shown in a "real", "practical" form. Yes, these appearances (at first glance) are noticeably different from each other. But, despite this, the "theoretical" and "practical" financial results on these Patterns are almost the same (they differ only in the amount of spreads and slippages).

In order to be convinced of this, it is enough to reproduce the results of the work of the expert, shown on slides 3 – 5, in the strategy tester of the MT4 terminal. How to do this is described in the next section.

One more small nuance. Point A shown on slides 3 and 4 (this is where the first Trading Cycles begin) is actually much to the left, outside of the images shown on these charts. This was done on purpose to show the work of the Expert Advisor on charts on a more acceptable scale. One could, of course, scale down to show the real position of point A, but then the images of the Patterns on these charts would be less demonstrative.

Demonstration of the work of "almost Grail" with the simplest Patterns in the strategy tester

For a better understanding of how the Expert Advisor works with the indicated Patterns, it is recommended to slowly follow its work in the strategy tester in the visualization mode. To do this, follow these steps.

1. Specify the name of the expert being tested in the strategy tester: YY_RRRobot.ex4.
2. In the strategy tester, click the "Expert properties" button. After that, set the following parameter values.
 - 2.1. On the "Testing" tab:
 - Initial deposit: 100000 USD;

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- Positions: Long & Short;
- other parameters do not matter.

2.2. On the "Inputs" tab in the "Value" column:

- Magic Number: 777;
- Grid Step (in points): 100;
- Grid Shift (in points) : 50;
- Amount of Lots: 0.1;
- Max Slippage (in points): 3;
- Max Spread (in points): 10;
- Ktat (Factor of the trend-antitrend 'soft' component): -1;
- Kfaf (Factor of the flat-antiflat 'soft' component): -2;
- Ktf (Factor of the trend-flat 'hard' component): 5;
- Target Profit Factor for Trading Cycle (off if PF<=1): 1.001;
- Mode of EA on restart: Continue_Previous_TradeCycle;
- Permanent data saving: true;
- If a Fatal Error is detected, then...: TradeCycle_Continue;
- Sounds: on;
- End the Trading Cycle manually: <Ctrl_J>;
- Remove Expert correctly: <Ctrl_Q>.

2.3. On the "Optimization" tab:

- all parameters are irrelevant.

3. Specify in the strategy tester:

- Symbol: EURUSD;
- Period: <see column "Period" in the Table 1 below>;
- Model: Every tick;
- Spread: 1;
- Use date: yes;
- From: <see column "Test start date" in the Table 1 below>
- To: <see column "Test end date" in the Table 1 below>
- Optimization: no;
- Visual mode: yes.

Table 1

S/N	Slide	Pattern	Pe-ri-od	Test start date	Test end date	TPF	Real PF	Sequence of Trading Cycles and Patterns (*)
1	3	Pattern #+10	M5	2021.04.23	2021.04.24	1.8	1.78	[#+10][#+10][#+10] [#-10][#11][#+10]
2	4	Pattern #-10	M5	2021.03.23	2021.03.24	1.8	1.80	[-10][-10][-10] [#11][#-10]
3	5	Pattern #11	M1	2020.11.09	2020.11.11	2.5	1.08	[#11][#11] [+3-9;73;+294-285=9] [+3-1;15;+39-37=2](**) [#-10][#+10][#-10]

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(*) In the Table, those Trading Cycles (Patterns) that are shown on the corresponding slides 3 – 5 are highlighted in color. The rest of the Trading Cycles (Patterns) (not highlighted in color) turned out to be "behind the scenes" and are not visible on these slides. But they can be seen in the strategy tester if you scroll the chart to the right.

(**) This is how complex (non-standard) Patterns are designated. Its parameters are given instead of its number. There are 6 parameters in total. The first two numbers are the maximum price deviations (expressed in "macropoints") up and down relative to the starting (zero) level of the Pattern, which took place during the entire existence of the Pattern. The next number is the number of "macroticks" during which this Pattern existed. The last three numbers are the trading result of this Pattern, expressed in "macropoints": GP, GL and NP, respectively.

4. Set the speed slider to a small value (for example: 11).

5. Press the "Start" button.

After some time, the EURUSD chart will open, where the playback of the Expert Advisor will start. For greater clarity, it is recommended to apply the Renko indicator (LRC – Line of Renko on the Chart) to this chart. To do this, follow these steps.

6. In the strategy tester, click the pause button.

7. Place the YY_LRC indicator on the chart and set the following parameters for it:

- Step of Levels in points 100;
- Shift of Levels in points 50;
- Show Level Lines true;
- Level Line Color Red;
- Level Line Style Dot;
- Level Line Width 0;

8. Unpause in the strategy tester, i.e. press the continue playback button.

9. After that, you can increase the playback speed (up to a maximum of 31).

After some time (approximately at 15:45 by the time in the tester, which can be seen at the bottom on the timeline scale), you will see on the screen of the strategy tester approximately the same situation as shown on slide 3. For slides 4 and 5, this time will be approximately equal to 15:35 and 10:20 respectively.

Important note! The time here is for the GMT+2 time zone. If your broker's trading server operates in a different time zone, then the picture that you see on the chart in the strategy tester may turn out to be completely different! The fact is that the result of the Expert Advisor's work (and the external picture of this work) very much depends on its start point on the time axis. (We will talk about this in detail when considering complex Patterns.) At the same time, in the strategy tester of the MT4 terminal, you cannot specify the start time of testing with an accuracy of an hour and a minute, you can only specify a date with an accuracy of a day number. In this case, testing will begin on the specified day, but from 00:00 local time. Therefore, if your broker's time zone differs from GMT+2, then the start point of the EA will be shifted by several hours and, as a result, you may see a completely different picture and the result of the EA's work. Not the same as shown on slides 3 – 5.

You shouldn't be surprised by this. It's not for nothing that the name of this Expert Advisor contains the word "Random". Yes, indeed the result of this Expert Advisor is random. But that's not the point. The main thing is that despite this randomness, the end result of this Expert Advisor is positive (with a high probability, almost equal to 1.00)!

But what if the time zone on your broker's server is different? But you still would like to see the work of the Expert Advisor in the tester with results similar to those given in this description.

There are variants here.

First variant. Simplest. Find a broker that has a trading demo-server running in the GMT+2 time zone. Download the MT4 terminal from this broker. Then you can safely test the Expert Advisor in this terminal.

Second variant. More difficult. Let's say that you did not find (or did not want to look for) a broker that operates in the GMT+2 time zone. In this case choose any other broker that works in any time zone. For example, in the GMT-7 time zone. After that, follow these steps.

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- 1) Download the MT4 terminal of this broker.
- 2) Make an export from the data archive for the EURUSD chart (for two timeframes: M1 and M5). You should end up with two data files, one for each timeframe.
- 3) Using the received files, you need to import these data back into the MT4 terminal. But at the same time, during the import process, you must specify the correct time offset. For example, you have data in the files for the GMT-7 time zone. And you need to transfer them to the GMT+2 time zone. Therefore, when importing data, you must specify an offset of +9 hours. Indeed: $\text{GMT}-7 + 9 = \text{GMT}+2$.
- 4) Restart the MT4 terminal: first close it and then start it.
- 5) Now you can safely test the Expert Advisor.
- 6) If desired, after the testing of the Expert Advisor is completed, you can restore the previous data in the MT4 terminal. To do this, you need to import data again from the same files that were previously created in accordance with p. 2. Only when importing, you must specify a time offset equal to 0 hours. Thus, the previous data will be completely restored.

Third variant. If you don't want to download any additional MT4 terminals from all sorts of different brokers, then you can use one of those working MT4 terminals that you already have installed. In this case you need to do with your working terminal exactly what is described above in **the second variant** (starting from p. 2).

But keep in mind that if something goes wrong, then you risk losing your authentic (original) data from your broker on the EURUSD currency pair. In addition, the actions that you will perform in accordance with the **second variant** will most likely prevent you from conducting normal trading on the same EURUSD currency pair. Therefore, you will have to do all these manipulations on the weekend, when most brokers have stopped trading on this symbol.

In short, all sorts of problems are guaranteed to you. Therefore, it is recommended to still use the **first** or **second variants** described above.

So, for simplicity, let's say that your tester works in the GMT+2 time zone. Then let's consider, for example, the operation of an Expert Advisor in the Strategy Tester with Pattern #+10 (see line 1 in Table 1). This test lasts exactly one day [twenty-four hours] (from 2021.04.23 00:00 to 2021.04.24 00:00). The "TPF" and "Real PF" columns show the value of the theoretical and real profit factor, respectively. As you can see, the difference between them is small (1.8 and 1.78). The real profit factor is slightly worse (i.e. less). This is due to spreads, slippage and (possibly) false (premature) triggering of some orders. Note also that the difference between the "theoretical" and "real" profit factors may arise not only because of this. Note that in the last column of Table 1 (which is called "Sequence of Trading Cycles and Patterns") shows that during the time that the test lasted (in this case, during the day) there were not only Patterns #±10. There was another Pattern #11. But these Patterns have different profit factors. And as you understand, in this case, the "real" profit factor will be made up of the profit factors of several different Patterns.

What about the net profit in this test? How much "theoretical" profit differs from "real"? This can be easily calculated. In total, there were 5 pieces of Patterns #±10 during the test. The theoretical profit for each of them is equal to 4 "macropoints". And there was another Pattern #11 for which the theoretical net profit is 3.

The total is: $5 * 4 + 1 * 3 = 23$ "macropoints".

The price of a "macropoint" for this test (and for all the others too) is \$10.

Thus, the "theoretical" net profit will be equal to \$230.

According to the test report, the "real" net profit is \$236.80.

As you can see, the difference is small.

And now you have made sure that those "theoretical" numbers for the values of GP, GL, NP, TPF (which appeared above in the text when describing various Patterns) correspond to reality.

Let's very briefly consider the work of the Expert Advisor with Pattern #-10 (see line 2 in Table 1). Here the "theoretical" and "real" profit factors completely coincided with each other. Let

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us now calculate the "theoretical" NP and compare it with the "real" one. In total, there were 4 pieces of Patterns #±10 during the test. The theoretical profit for each of them is equal to 4 "macropoints". And there was one more Pattern #11, for which the theoretical net profit is 3.

The total is: $4 * 4 + 1 * 3 = 19$ "macropoints".

Since the price of a "macropoint" is \$10, the "theoretical" net profit will be \$190.

According to the test report, the "real" net profit is \$183.90.

So there is little difference here.

It is much more interesting to consider the work of the Expert Advisor with Pattern #11 (see line 3 in Table 1). Here the "theoretical" and "real" profit factors are very different from each other: 2.5 and 1.08. The fact is that there were two non-standard (complex) Patterns here during the testing period. And they turned out to have very small profit factors: one had $PF = 294/285 = 1.03$, the other had $PF = 39/37 = 1.05$. So they "pulled" the overall profit factor down.

It is also interesting to know and compare the "theoretical" and "real" net profit for this case. So, during the test there were 2 pieces of Patterns #11. The theoretical profit for each of them is equal to 3 "macropoints". Next, there were 3 more pieces of Patterns #±10, for which the theoretical net profit is 4. And, finally, there were two non-standard Patterns, which brought a net profit of 9 and 2 "macropoints".

In total we have: $2 * 3 + 3 * 4 + 9 + 2 = 29$ "macropoints".

Since the price of a "macropoint" is \$10, the "theoretical" net profit will be \$290.

According to the test report, the "real" net profit is \$260.52.

As you can see, here the difference turned out to be somewhat larger than before: almost 3 "macropoints".

"Almost Grail" work with simple Patterns

The work of the Expert Advisor with simple Patterns in a general (schematic) form is shown on slides 6 and 9. It should be noted right away that the result of the Expert Advisor's work with these Patterns significantly depends on the starting point (or initial phase) of the Pattern, from which the Expert Advisor will start working.

What is a phase and how it affects the operation of an Expert Advisor, it is best to consider using Pattern #22 as an example.

Work on Pattern #22 (phases A and C)

Slide 6 shows a schematic image of Pattern #22. This Pattern has four phases, which are denoted by the letters A, B, C and D. Which of these phases will take effect depends only on the starting point of the Expert Advisor's Trading Cycle. If the Expert Advisor starts the next Trading Cycle at any of points A (A1, A2, A3, etc.), then phase A of Pattern #22 will be active. If the EA starts the Trading Cycle at any of the points B (B1, B2, B3, etc.), then phase B of Pattern #22 will be in effect. The same can be said for phases C and D.

Now let's take a closer look at the Trading Cycles shown at the top of slide 6. As you can see, each Trading Cycle lasts exactly two "macroticks", and the profit for each of these Cycles is 4 "macropoints". Doesn't this remind you of anything? Oh sure! This is a typical EA work on Pattern #±10 (see slide 2). The only difference is that on slide 2 Patterns #±10 follow one after the other in the same direction (or only up or only down). And on slide 6, these same Patterns follow each other (Pattern #+10 is followed by Pattern #-10 and vice versa). In other words, we can say that Pattern #22 breaks up into many Patterns #±10, alternately replacing each other.

Here's what else you should pay attention to. Look carefully at the top part of slide 6. If the Trading Cycle started at any of the points A, then it will end at one of the points C. Conversely, if the Trading Cycle started at any of the points C, then it will end at one of the points A. The same

can be said in other words: after the Trading Cycle in phase A, the Cycle in phase C will follow. And vice versa. That is, phases A and C are constantly changing.

One more small note. For the specific example shown at the top part of slide 6, phase A corresponds to Pattern #+10 and phase C corresponds to Pattern #-10.

Work on Pattern #22 (phases B and D)

The work of the Expert Advisor in Pattern #22 in Phase B is shown at the bottom part of slide 6. The work of the Expert Advisor in Phase D is not shown on this slide, but it is exactly the same as in Phase B. And the financial result is the same. As you can see, here the situation is very different from the one that takes place when working with phases A and C. Here the Trading Cycle lasts as many as 10 "macroticks", and the financial result is only one "macropoint"! For comparison: when the Expert Advisor works with the same Pattern (but with phases A and C), $10/2 = 5$ Trading Cycles will pass within 10 "macroticks", each of which will bring 4 "macropoints". Total net profit will be $5 \times 4 = 20$ "macropoints"!

Another feature is that after the completion of the Trading Cycle associated with phase B, the next Trading Cycle will be related to phase D. This can be clearly seen in the figure at the bottom part of slide 6: the Trading Cycle, which began at point B, ends at point D2, where a new Trading Cycle immediately begins. After the completion of this new Cycle, the Cycle following it will again belong to phase B. Thus, phases B and D will constantly replace each other.

Summing up the work of the Expert Advisor with Pattern #22, we can say the following. When working with this Pattern, one of two scenarios is possible.

1st scenario. Cyclical change of phases A and C. In this case, the net profit will be equal to 20 "macropoints" for every 10 "macroticks".

2nd scenario. Cyclical change of phases B and D. In this case, the net profit will be equal to 1 "macropoint" for every 10 "macroticks".

But these scenarios are shifted relative to each other by only one phase (or, in other words, by one "macrotick")!

In this regard, two important remarks should be made.

Firstly, the Trading Cycle in Pattern #22 can start from any phase with equal probability. In other words, the probability of getting into a "good" (A or C) or a "bad" (B or D) phase is approximately the same: 50% to 50%.

Secondly, as mentioned above, these scenarios are shifted relative to each other by only one phase (i.e., one "macrotick")! And then there is a temptation to increase the efficiency of the Expert Advisor on this Pattern. It looks like this: let's say that we saw that the Trading Cycle began in the "bad" phase (B or D) of Pattern #22. Then we calmly wait for its end (we "know" that it will end in 10th "macrotick") and immediately make a delay for 1 "macrotick". As a result, we enter the "good" phase (A or C) and thereby increase the efficiency of the Expert Advisor.

Theoretically, all these arguments are absolutely correct. Everything will be just like that. But...

But the thing is that in real life the behavior of the market is very unstable. And at the moment when we make a delay for 1 "macrotick", Pattern #22 will already end, and some other one will begin instead of it. Moreover, even earlier we may not wait for those 10 "macroticks" (after which we need to make a delay), and Pattern #22 literally before our eyes will turn into another, more complex Pattern. That is, there are a lot of variants for destroying our plans.

How then to be? Actually the answer to this question is very simple. You don't need to anticipate anything. It is necessary to work precisely with the situation that has developed in the market at the moment. The expert does just that. What? Did the Trading Cycle start in Pattern #22 in a "bad" phase? It's not scary. The EA will patiently wait for this Trading Cycle to go positive and complete it (this will happen on the 10th "macroticks"). What? Did Pattern #22 turn into a more

complex Pattern before reaching the 10th "macroticks"? No problem. This Expert Advisor can work with complex Patterns as well. But this will be discussed below in a separate section.

Illustration of working on Pattern #22

If slide 6 shows the Expert Advisor's work with Pattern #22 in a simplified ("theoretical") form, then slides 7 and 8 show the same thing, but in a "real" ("practical") form, so to speak. These slides show the start and end points of the Trading Cycles. Moreover, the designations of the points on slides 7 and 8 coincide with the designation of the same points on slide 6.

In order to verify the authenticity of the images shown on slides 7 and 8, it is enough to reproduce the results of the expert's work in the strategy tester of the MT4 terminal. How to do this is described in the next section.

Demonstration of work on Pattern #22 in the strategy tester

For a better understanding of the work of the Expert Advisor with the specified Pattern, it is recommended to slowly follow its work in the strategy tester in the visualization mode. To do this, follow these steps.

Perform the steps described above in p.p. 1 – 9 from the section **"Demonstration of the work of "almost Grail" with the simplest Patterns in the strategy tester"**. But when performing these actions, you should use the data and parameters from the Table 2, not from Table 1.

Table 2

S/N	Slide	Pattern, phase	Period	Test start date	Test end date	TPF	Real PF	Sequence of Trading Cycles and Patterns (*)
4	7	Pattern #22, phase A, C	M5	2021.06.21	2021.06.22	1.8	1.13	[#+10][#-10][#+10] [#-10][#+10][#+10] [+2-1;6;+15-26=-11] (**)
5	8	Pattern #22, phase B, D	M5	2022.02.07	2022.02.09	1.071	1.14	(***) [#-10] [+2-1;17;+26-23=3] [#11][#22][#-10] [+1-1;10;+15-14=1] [0-1;2;+3-7=-4]

(*) In the Table, those Trading Cycles (Patterns) that are shown on the corresponding slides 7, 8 are highlighted in color. The rest of the Trading Cycles (Patterns) (not highlighted in color) turned out to be "behind the scenes" and are not visible on these slides. But they can be seen in the strategy tester if you scroll the chart to the right or left.

(**) This is how complex (non-standard) Patterns are designated. Its parameters are given instead of its number. There are 6 parameters in total. The first two numbers are the maximum price deviations (expressed in "macropoints") up and down relative to the starting (zero) level of the Pattern, which took place during the entire existence of the Pattern. The next number is the number of "macroticks" during which this Pattern existed. The last three numbers are the trading result of this Pattern, expressed in "macropoints": GP, GL and NP, respectively.

(***) Pattern #22 starts at 17:50.

After some time (approximately at 10:35 am by the tester time, which can be seen at the bottom on the timeline scale), you will see on the strategy tester screen approximately the same situation as shown on slide 7. For slide 8, this time will be approximately equal to 04:25 (on second day of testing).

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Let's take a closer look at how the Expert Advisor works in the Strategy Tester with Pattern #22 in phases A or C (see line 4 in Table 2). This test lasts exactly one day [twenty-four hours] (from 2021.06.21 00:00 to 2021.06.22 00:00). The last column of this Table shows the sequence of Trading Cycles and Patterns that took place during the test. It may seem strange that in the test dedicated to Pattern #22, this Pattern is not mentioned even once. In fact, there is nothing strange about this. After all, you already know that Pattern #22 in phases A or C breaks down into a series of Patterns #±10. So, it is this series of Patterns that is shown in the last column of the Table (this series of Patterns is highlighted in turquoise).

Note also that this test has a complex Pattern at the very end of the test. And he has a negative result: -11 "macropoints". The thing is that this is an incomplete (terminal) Pattern: the test is over, but the Pattern is not. If the test continued further, then this Pattern would inevitably be brought to the "plus" and immediately completed. By the way, it is "thanks" to this complex unfinished negative Pattern that the "real" profit factor (1.13) turned out to be less than the "theoretical" one (1.8).

It is also interesting for this test to calculate the "theoretical" net profit and compare it with the "real" one. So, we have 6 Patterns #±10, each of which brings 4 "macropoints" of net profit. And there was also an unfinished complex Pattern, which brought 11 "macropoints" of net loss.

The total is: $6 * 4 - 1 * 11 = 13$ "macropoints".

Since the price of a "macropoint" is \$10, the "theoretical" net profit will be \$130.

According to the test report, the "real" net profit is \$82.10.

As you can see, the difference is big, but still more or less acceptable.

Now let's consider the work of the Expert Advisor in the strategy tester with Pattern #22 in the "bad" phase B (see line 5 in Table 2). This test lasts two days (from 2022.02.07 00:00 to 2022.02.09 00:00). The test turned out to be so long because Pattern #22 (for which this test was made) starts quite late (at about 17:25) and ends after midnight (at about 04:25).

You already know that Pattern #22 is very low-profit: it brings only one "macropoint" of net profit and has a very low "theoretical" profit factor: 1.071. And in addition to this, this particular test is being pursued by some kind of "evil fate". His time frame included two low-yield complex Patterns (with a net profit of 3 and 1 "macropoints") and one terminal Pattern, which brought a net loss of 4 "macropoints". And despite this, the resulting profit factor turned out to be not so small: 1.14. The thing is that during this test there were three more Patterns with large profit factor values (two Patterns #-10 with a profit factor of 1.8 and one Pattern #11 with a profit factor of 2.5). Here they are, and leveled the situation.

And finally, let's calculate the "theoretical" net profit for this test and compare it with the "real" one. So, we have:

- two Patterns #-10, each brings a net profit of 4 "macropoints";
- one Pattern #11 with a profit of 3 "macropoints";
- one Pattern #22 with a profit of 1 "macropoint";
- one complex Pattern with a profit of 3 "macropoints";
- one complex Pattern with a profit of 1 "macropoint";
- one terminal complex Pattern with a net loss of 3 "macropoints".

The total is: $2 * 4 + 1 * 3 + 1 * 1 + 1 * 3 + 1 * 1 - 1 * 3 = 13$ "macropoints".

Since the price of a "macropoint" is \$10, the "theoretical" net profit will be \$130.

According to the test report, the "real" net profit is \$98.81.

As you can see, the difference is big, but still more or less acceptable.

Work on Pattern #+21 (phases A and C)

Here, in this description, we will consider only Pattern #+21, since everything that can be said about it applies equally to Pattern #-21.

Slide 9 shows a schematic representation of Pattern #+21. This Pattern has three phases, which are denoted by the letters A, B and C. Which of these phases will take effect depends only on the starting point of the Expert Advisor's Trading Cycle. If the EA starts the next Trading Cycle at any of points A (A1, A2, A3, etc.), then phase A of Pattern #+21 will be in effect. If the EA starts the Trading Cycle at any of the points B (B1, B2, B3, etc.), then phase B of Pattern #+21 will be in effect. The same can be said about phase C.

Now let's take a closer look at the Trading Cycles shown on the left side of slide 9. It shows two Trading Cycles: the first of them fell into phase A, and the second – into phase C. We already know how the EA works in phase A. This is nothing else than working with Pattern #+10: The Trading Cycle lasts exactly two "macroticks", and at the same time the net profit is 4 "macropoints". But the work of the Expert Advisor in phase C is not so optimistic. Here the Trading Cycle lasts as many as 12 "macroticks", and the financial result is equal to only one "macropoint"! Yes, this is not much, and the profit factor is very low (1.02). But, nevertheless, the expert confirms his "title of almost the Grail", since the result is ultimately still positive.

Here's what else you should pay attention to. Look carefully at the left side of slide 9. If the Trading Cycle began at any of points A, then it will end at one of points C. But if the Trading Cycle began at any of points C, then it will also end at one of points C. Then the same can be said in other words: after the Trading Cycle that has passed in phase A, the Cycle will follow in phase C. But after the Trading Cycle that has passed in phase C, a new Cycle will follow again in the same phase C.

Work on Pattern #+21 (phase B)

The work of the Expert Advisor on Pattern #+21 in phase B is shown on the right side of slide 9. As you can see, each Trading Cycle lasts three "macroticks", and the profit for each of these Cycles is equal to 3 "macropoints". Doesn't this remind you of anything? Oh sure! This is a typical EA work on Pattern #11 (see slide 2). The only difference is that on slide 2, Patterns #11 follow each other strictly to the right, neither rising up nor falling down. And on slide 9, these same Patterns follow each other, gradually shifting in the same direction (in this case, only up). In other words, we can say that Pattern #+21 splits into many Patterns #11.

Note also that for Pattern #-21, Patterns #11 also follow each other, also gradually shifting in the same direction (but not up, but down). In the future, we will not consider Pattern #-21 at all within the framework of this description, since it practically does not differ in anything (except for its direction) from Pattern #+21.

As you can see, the situation here is very different from the one that takes place when working with phase C. Recall: for phase C, the Trading Cycle lasts as many as 12 "macroticks", and the financial result is equal to only one "macropoint"! When the EA works with phase B, within 12 "macroticks" will pass $12/3 = 4$ Trading Cycles, each of which will bring 3 "macropoints". Total net profit will be $4 \times 3 = 12$ "macropoints"! These are the contrasts that can arise during the operation of this Expert Advisor. But the main thing is that in (almost) any situation, the expert goes to the "plus".

Illustration of working on Pattern #+21

If slide 9 shows the work of the Expert Advisor with Pattern #+21 in a simplified ("theoretical") form, then slides 10 and 11 show the same thing, but in, so to speak, "real" ("practical") form. These slides show the start and end points of the Trading Cycles. Moreover, the designations of the points on slides 10 and 11 coincide with the designation of the same points on slide 9.

There is one small nuance. The starting (far left) points (point C, shown on slide 10 and point B, shown on slide 11) are actually much to the left, outside of the images shown in these

charts. This was done on purpose to show the work of the Expert Advisor on charts on a more acceptable scale. One could, of course, scale down to show the real position of these points, but then the images of the Patterns on these charts would be less demonstrative.

In order to verify the authenticity of the images shown on slides 10 and 11, it is enough to reproduce the results of the expert's work in the strategy tester of the MT4 terminal. How to do this is described in the next section.

Demonstration of work on Pattern #+21 in the strategy tester

For a better understanding of the work of the Expert Advisor with the specified Pattern, it is recommended to slowly follow its work in the strategy tester in the visualization mode. To do this, follow these steps.

Perform the steps described above in p.p. 1 – 9 from the section **"Demonstration of the work of "almost Grail" with the simplest Patterns in the strategy tester"**. But when performing these actions, you should use the data and parameters from the Table 3, not from Table 1.

Table 3

S/N	Slide	Pattern, phase	Period	Test start date	Test end date	TPF	Real PF	Sequence of Trading Cycles and Patterns (*)
6	10	Pattern #+21, phase C	M5	2021.04.01	2021.04.02	1.02	1.02	[#+21]
7	11	Pattern #+21, phase B	M5	2020.11.30	2020.12.01	2.5	1.82	[#11][#11][#11][#-10] [#-10][#11][#-10]

(*) In the Table, those Trading Cycles (Patterns) that are shown on the corresponding slides 10, 11 are highlighted in color. The rest of the Trading Cycles (Patterns) (not highlighted in color) turned out to be "behind the scenes" and are not visible on these slides. But they can be seen in the strategy tester if you scroll the chart to the right.

After some time (approximately at 18:40 by the tester time, which can be seen at the bottom on the timeline scale), you will see on the strategy tester screen approximately the same situation as shown on slide 10. For slide 11, this time will be approximately equal to 17:10.

Let's take a closer look at the operation of the Expert Advisor in the strategy tester with Pattern #+21 in phase C (see line 6 in Table 3). This test lasts exactly one day (from 2021.04.01 00:00 to 2021.04.02 00:00). The last column of this Table shows the sequence of Trading Cycles and Patterns that took place during the test. It so happened (purely by chance) that Pattern #+21 almost exactly coincided with the time of the test. As a result, this Pattern found itself in "proud solitude". And all the other Patterns were outside the limits of this test, and thus could not affect its financial results in any way. That's exactly why the "theoretical" profit factor for this Pattern almost exactly coincided with the "real" profit factor of this test (1.02).

It is interesting for this test to calculate the "theoretical" net profit and compare it with the "real" one. So, we have exactly one Pattern #+21, which, as you know, brings exactly one "macropoint" of net profit.

The result is: $1 * 1 = 1$ "macropoint".

Since the price of a "macropoint" is \$10, the "theoretical" net profit will be \$10.

According to the test report, the "real" net profit is \$11.60.

As you can see, the difference is not significant. It is a bit surprising that the "real" profit turned out to be slightly more than the "theoretical" one. How can this be? What about spreads? After all, only because of them everything should have been the other way around. In fact, the

spread in this test was set to the lowest possible. This was done specifically in order to get as little difference as possible between "theoretical" and "real" results. This is firstly. And secondly, in addition to spreads, there are also slippages. And they can be both positive and negative. In this case, they turned out to be mostly positive, and thus compensated for the effect of the spread.

Now let's consider the work of the Expert Advisor in the strategy tester with Pattern #+21 in phase B (see line 7 in Table 3). This test lasts exactly one day (from 2020.11.30 00:00 to 2020.12.01 00:00). The last column of this Table shows the sequence of Trading Cycles and Patterns that took place during the test. It may seem strange that in the test dedicated to Pattern #+21, this Pattern is not mentioned even once. In fact, there is nothing strange about this. After all, you already know that Pattern #+21 in phase B breaks up into a series of Patterns #11. So, it is this series of Patterns that is shown in the last column of the Table (this series of Patterns is highlighted in turquoise).

Let's also note that in this test, in addition to 4 Patterns #11 (which have a significant profit factor: 2.5), there were three more Patterns #-10, which have a slightly lower profit factor: 1.8. It is because of this that the "real" profit factor (1.82) turned out to be less than the "theoretical" one (2.5).

And finally, let's calculate the "theoretical" net profit for this test and compare it with the "real" one. So, we have:

- four Patterns #11, each brings a net profit of 3 "macropoints";
- three Patterns #-10 with a profit of 4 "macropoints".

The total is: $4 * 3 + 3 * 4 = 24$ "macropoints".

Since the price of a "macropoint" is \$10, the "theoretical" net profit would be \$240.

According to the test report, the "real" net profit is \$210.20.

As you can see, the difference is big, but still more or less acceptable.

"Almost Grail" work with complex Patterns

So, if you have read up to this point, then you already know that this Expert Advisor is "almost Grail". What does this mean? It only means that it meets some purely formal criteria. Namely, this EA brings positive results on all simple and simplest price Patterns shown on slide 1. And what about other complex Patterns (which are not shown on this slide)?

It turns out that this Expert Advisor can work quite well with them. What does this mean? To answer this question, we must first give some classification of complex Patterns. So, complex Patterns (from the point of view of this expert) are divided into:

- flat-like (symmetrical) Patterns;
- trend-like (asymmetric) Patterns;
- other Patterns that cannot be attributed to the previous two types.

Running a little ahead, we can immediately say that when working with flat- and trend-like Patterns, this Expert Advisor works in the same way as with simple and/or simplest Patterns. That is, it always goes to "plus". But with other Patterns, the situation is somewhat ambiguous. Depending on the situation, this expert can give both positive and negative results. Moreover, the probability of a negative result is much lower than the probability of a positive result.

But first things first.

"Almost Grail" work with flat-like Patterns

The work of this Expert Advisor with a flat-like Pattern is shown on slide 12A. Let's consider it in more detail. As it is described, we will gradually introduce some important concepts and terms, which will be highlighted in quotation marks below in the text.

So, as you can see on this slide, the work of the expert begins at point 1. This point is located at the so-called "zero level". In other words, the "zero level" is the price at which the Pattern

begins. During the formation of the Pattern, the price either rises above this "zero level", or falls below it.

Along with the term "zero level", hereinafter its synonym can be used, which sounds like "Pattern center" or simply "center".

The extreme upper level and the extreme lower level, which were reached during the entire time of the formation of the Pattern, form the so-called "Pattern channel". This channel is characterized by two very important characteristics (values), which are indicated on slide 12A by the letters D and d. What it is?

This is nothing but the maximum price deviations (relative to the "zero level") that took place during the entire time of the formation of the Pattern. Of course, there should be two such deviations: one deviation upward, the other downward. As a rule, one of these deviations is greater in magnitude than the other. So, the deviation, which is more indicated by a capital letter "D", and the one that is less – by a small letter "d". For example, in slide 12A, the maximum downward deviation is 3 "macropoints" and the maximum upward deviation is 2 "macropoints". Therefore, the downward deflection is denoted as D and the upward deflection as d. And then for this particular Pattern:

$$D = 3; d = 2.$$

Further, the sum of these two quantities is called the "channel range", and is denoted by the letter R. Thus,

$$R = D + d.$$

There is another important value, which is called "channel skew". It is equal to the ratio of D and d:

$$s = D / d.$$

If the deviations in both directions are equal to each other (i.e. $D = d$), then we are dealing with a symmetrical "channel". For such a "channel" its "skew" is equal to one. For an asymmetrical channel, the "skew" will always be greater than one. For example, the "Pattern channel" shown on slide 12A is slightly asymmetrical, and its "skew" is:

$$s = D / d = 3 / 2 = 1.5.$$

And finally, there is another important parameter. This is the number of price movements (or the number of "macroticks") that have passed during the entire time the Pattern was formed. This parameter is denoted by the letter n.

But back to the description of the situation shown on slide 12A. At some point in time (this is point 2 on the slide), the "channel" stops expanding, i.e. in the future, the maximum deviations D and d remain unchanged. Then, further at some point 3, the expert necessarily and inevitably goes into the "plus", and this is where the Trading Cycle ends.

The question may arise: why does the Expert Advisor go positive at point 3? Where does it come from? Everything is very simple. When working with flat-like Patterns, the main work is performed by anti-trend and anti-flat pyramids, which are controlled by this Expert Advisor. These pyramids are arranged in such a way that on each price movement (that is, on each "macrotick") they give some fixed profit (which is equal to one or two "macropoints"). But at the same time, these same pyramids create some negative floating loss. This loss mainly depends on the width of the "Pattern channel". The wider the channel, the greater the floating loss.

The result is the following picture. We are now considering working with a flat-like Pattern. As you know, it has a limited width. Consequently, the floating loss (which is created by the anti-trend and anti-flat pyramids) will also be limited. That is, it will hardly change over time. At the same time, with each new "macrotick" these same pyramids will bring some small fixed profit. This profit will gradually accumulate and, finally, there will come a moment when it will exceed the value of the floating (but limited) loss. That is, in other words, sooner or later the Expert Advisor will go positive and immediately complete the current Trading Cycle.

In this particular example, which is shown on slide 12A, it took 38 "macroticks" to get to the "plus". And the wider the "Pattern channel" is, the more "macroticks" will be needed to get into the "plus".

Note also that in this particular example, the net profit was 2 "macropoints", and the profit factor was 1.033.

So the general conclusion is:

When working with any flat-like Pattern
this expert will be in the "plus".

"Almost Grail" work with trend-like Patterns

The operation of this Expert Advisor with a trend-like Pattern is shown on slide 12B.

This Pattern (and the Trading Cycle) began to form at point 1. It should be noted that a trend-like Pattern, despite its name, always starts as a flat-like Pattern. Otherwise it can not be. The fact is that if it behaves like a trend from the very first two or three "macroticks", then this will mean that we are dealing with a recoilless (or almost recoilless) impulse. That is, we are talking about Pattern #±10, which belongs to the class of the simplest (not complex) Patterns.

Thus, a trend-like Pattern always consists of two phases: flat and trend. Moreover, the flat phase lasts at least three "macroticks". In general, the actual duration of this phase is much longer. In the specific example shown on slide 12B, this phase lasted 17 "macroticks". For clarity, these 17 "macroticks" are taken (one by one) from slide 12A, dedicated to the flat-like Pattern. This demonstrates here that the two Patterns shown on slides 12A and 12B behave in a similar way at the beginning of their formation. But then their paths diverge. The Pattern on slide 12A remains flat until the very end. But the Pattern on slide 12B is moving into a trending phase. And, thanks to this, after only 7 "macroticks" the Expert Advisor becomes a "plus". As a result, the Pattern (and with it the Trading Cycle) ends.

The end result of the Expert Advisor's work with this particular Pattern is as follows: the net profit was 3 "macropoints", and the profit factor was 1.017.

It should be noted that this positive outcome of working with a trend-like Pattern is not accidental. Why? The fact is that this Expert Advisor in its work relies on the assumption that the price movement is not much different from a discrete random walk. And the random walk has one fundamental property. It consists in the following. The more walk steps have taken place, the more likely it is that for a given particular implementation of this random walk, the "skew" value $s = D/d$ will reach the value $4/1 = 4$. In other words, the more walk steps have occurred, the more and more there will be more such implementations for which the "skew" value $s = D/d$ reaches the value $4/1 = 4$ at least once during the entire existence of these implementations. And the total share of such implementations over time significantly exceeds 50% of the total number of implementations.

Now look at slide 12B. What is amount of "skew" of the Pattern shown on this slide? Since this Pattern has $D = 8$ and $d = 2$, then the "skew" is $s = D/d = 8/2 = 4/1 = 4$. And note that this amount of "skew" occurred exactly at point 2, and it was at this point that the Expert Advisor went "plus". Thus, this Trading Cycle was completed with a positive result.

But why? Why does the EA go into the "plus" with "skew" $s = 4$? Everything is very simple. The fact is that there are three pyramids in this Expert Advisor: anti-trend, anti-flat and trend. The first two pyramids are negative, and the third one is positive. So, in the Expert Advisor the proportions of these pyramids are selected in such a special way that (namely, at $s = 4$) the profit from the positive pyramid exactly covers the loss from the other two negative pyramids. Of course, these proportions are calculated purely theoretically and provided that the number of price steps n (that is, the number of "macroticks") tends to infinity. And this means that in order to reach the

"plus", in addition to the "skew" $s = 4$, a certain minimum number of steps n_{\min} is also necessary. For this particular case, shown on slide 12B, $n_{\min} = 22$, and the actual number of steps is $n = 24$. So this number of steps was just enough for the Expert Advisor to become a "plus".

It should be noted that the "skew" s often exceeds 4. But for an expert, this is even better. The greater the "skew" value, the greater the probability of the expert's going into the "plus" and the greater this "plus" will be. By the way, the same theoretical calculations show that with $s = 5$, the Expert Advisor is guaranteed to go into the "plus" regardless of how many steps n ("macroticks") will be in the trend-like Pattern.

So the general conclusion is:

When working with any trend-like Pattern
this expert will be in the "plus".

"Almost Grail" work with other Patterns

Based on what was said above (and also demonstrated on real market data), it is clear that this Expert Advisor is essentially "all-weather" or "omnivorous". It works everywhere: both on a trend and in a flat. And even completely unimaginable, nameless and formless Patterns (see slides 12A and 12B) are not an obstacle for him. And he always, even if he does not earn a lot, then at least he will definitely come out in the "plus". You might think that we have before us "almost a pure Grail".

But, alas! This is not entirely true. Why?

The fact is that there is a certain class of Patterns, which is called "other" here. So, these "other" Patterns have one very bad property. They expand their "Pattern channel" 1) constantly and 2) alternately in one direction, then in the other.

Exactly. Precisely "constantly", and precisely "alternately in one direction, then in the other". Because if the "channel" expands not "constantly", then the Pattern will degenerate into a flat-like one. The result will be something like what is shown on slide 12A. And if the "channel" expands only in one direction (or predominantly only in one direction), then the Pattern will degenerate into a trend-like one. The result will be something like what is shown in slide 12B.

An example of such a "other" Pattern is shown on slide 12C. It is very similar to the Pattern, which is called "symmetrical expanding triangle" in classical technical analysis. Of course, this Pattern on slide 12C is presented in a somewhat idealized form with "smooth" (recoilless) segments. This was done on purpose, since it is the "smoothness" of the segments that makes it difficult (more precisely, it minimizes) making profit from the anti-trend and anti-flat pyramids. (Recall that the profit from these pyramids depends on the number of "macroticks": the fewer there are, the less profit there will be.)

So, let's consider the operation of the Expert Advisor on this Pattern, provided that its starting point is located at the "zero level" (i.e., it is the leftmost red dot on slide 12C). In this case, the Expert Advisor will bring losses that grow with time and are not compensated in any way. Why? The fact is that, firstly, the anti-trend and anti-flat pyramids will bring little profit due to the "smoothness" of the segments of this Pattern (this was discussed above). And this profit will not be able to compensate for the floating losses of these pyramids, since they depend on the width of the "Pattern channel". The larger the width, the greater the loss. And, as you know, the "Pattern channel" is constantly expanding here, which means that the losses are growing. Secondly, this floating loss (brought by these two pyramids) cannot be compensated by the profit from the trend pyramid, since for such compensation it is necessary that the "skew" s be equal to 4. And the peculiarity of this Pattern is that its "skew" is much less than 4. Moreover, its "skew" tends over time to its lowest possible value, i.e. to the one.

But it is not all that bad. The fact is that the Pattern shown on slide 12C is artificial. It is calculated theoretically in such a way as to cause maximum "harm" to the expert. In real life, such a Pattern (and others like it) is extremely rare. And the more price steps ("macroticks") pass in the process of a random walk, the fewer and fewer such "harmful" Patterns remain.

Let's dwell on this in a little more detail. Look closely at slide 12C. The Pattern shown on it has 5 "smooth" (recoilless) segments. The sixth segment has just begun to take shape. Theoretically, it can become larger (longer) than the previous fifth segment. But in real life... Let's remember at least the theory of Elliott waves or classical technical analysis. The Pattern shown on slide 12C is what both of the above disciplines call the "symmetrical expanding triangle". Elliott's theory, for example, states that such triangles cannot have more than 5 expanding segments. And classical technical analysis claims that such a Pattern indicates the extreme instability (uncertainty) of the market. It is usually followed by a sharp and/or prolonged price movement in any direction (up or down). This is considered the most likely option. A less likely scenario is that the market will calm down and its fluctuations will decrease. And then the "expanding triangle" will be followed by the "contracting triangle". The result will be a Pattern, which is called "Diamond" in classical technical analysis.

Note that both options for the development of the situation described above are quite acceptable for an expert. After all, he perfectly copes with both sharp and/or long-term price movements (in any direction), and with protracted flats.

By the way, take a closer look at slide 12A. After all, it shows the Pattern, which is a "tracing paper" from real market movements. Did you notice that an "expanding triangle" was forming at the very beginning of this Pattern? Three segments of this triangle have managed to form. True, these segments are not "smooth", since they had recoil "macroticks" in their composition. Let's list these segments:

- the first segment started at point 1; its direction is down; it lasted only one "macrotick";
- the second segment lasted 5 "macroticks" (among them one rollback); segment direction – up;
- the third segment lasted as many as 11 "macroticks"; its direction is down; this segment ended at point 2.

After that, the 4th segment began to form. But this segment was not fully formed, as it degenerated into a protracted flat. And thanks to this protracted flat, the EA manages to get a "plus".

Slide 12B shows another (alternative) development of events. The Pattern shown on this slide begins to form in exactly the same way. First, an "expanding triangle" is formed, consisting of three segments. Moreover, these segments are exactly the same as those discussed earlier. But then the third segment "suddenly and sharply" and almost without recoil lengthens downwards. And thanks to this sharp movement, the expert manages to get into the "plus".

And, finally, one more argument in favor of this expert.

Take another look at the Pattern shown on slide 12C. It consists from a series of segments. And each segment is larger than the previous one:

- the length of the 1st segment is equal to 1 "macrotick";
- the length of the 2nd segment is equal to 3 "macroticks";
- the length of the 3rd segment is equal to 5 "macroticks";
- the length of the 4th segment is equal to 7 "macroticks";
- the length of the 5th segment is equal to 9 "macroticks";
- and so on...

Moreover, all segments, starting from the 3rd, contain points of green or turquoise color. What do these colors mean?

A green dot means that if the Trading Cycle starts at this point, it will end in 2 "macroticks" with a positive result: net profit will be equal to 4 "macropoints", and the profit factor will be equal to 1.8. And you, of course, already know why it will happen this way. The fact is that all segments,

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starting from the third, are nothing but Patterns #±10. And how the expert works with these Patterns is shown on slides 2, 3 and 4.

The dots in turquoise show places where we were a little less fortunate. If the Trading Cycle starts at any of these points, then it will also bring a positive, but more modest result. The Trading Cycle will end in 7 "macroticks". In this case, the net profit will be equal to one "macropoint". And the profit factor will be equal to 1.016.

But there are two more red dots on slide 12C. And you already know what they mean. If the Trading Cycle starts at one of these points, then in the process of trading the loss will increase indefinitely (provided that this Pattern also exists indefinitely). Theoretically, this is possible. But in real life this is very unlikely. And we have already talked about this with you above.

Furthermore. As you understand, the trading process is often random. This means that the Trading Cycle can start at any of the points shown on slide 12C with equal probability. And as you can see, there are much more green and turquoise (positive) points than red ones. This means that it is certainly possible to hit the red dot, but this is unlikely, since there are only 2 pieces of them for the entire Pattern. And if you "miss", i.e. move relative to these red dots by only one or two "macroticks", then you will have solid profits on this Pattern instead of continuous losses!

So the general conclusion is:

When working with any "other" Pattern, this Expert Advisor
with a high probability will go to the "plus".

And finally, the most-most-most general conclusion:

This expert is really and rightfully
belongs to the "almost Grail" class.

This expert lacks quite a bit,
to classify it as a "pure Grail"!

Information for advanced users

Features and recommendations for working with an expert

Very important note! The conclusions that were made in the previous section are valid only for the work of the Expert Advisor with a very specific set of parameters. I mean the set that is set for this expert by default. But there is an important clarification to be made here.

Not all parameters critically affect the result of the Expert Advisor's work, and some parameters do not affect at all. Therefore, all parameters can be divided into several categories:

- fundamental parameters – strongly affect not only the final financial result, but also the very nature (foundation, basis) of the trading system, which underlies the work of the expert;
- important parameters – significantly affect the final financial result, but do not affect the basis of the expert's functioning;
- secondary parameters – relatively little (or almost no) influence on the financial result of the expert's work;
- auxiliary parameters – do not affect the financial result of the expert's work at all.

Here are the lists of these parameters.

List of fundamental parameters:

- **Ktat; Kfaf; Ktf;**
- **Target Profit Factor for Trading Cycle.**

List of important parameters:

- **Grid Step;**
- **Amount of Lots;**
- **If a Fatal Error is detected, then...**

List of secondary parameters:

- **Grid Shift;**
- **Max Slippage;**
- **Max Spread;**
- **Mode of EA on restart.**

List of auxiliary parameters:

- **Magic Number;**
- **Permanent data saving;**
- **Sounds;**
- **End the Trading Cycle manually;**
- **Remove Expert correctly.**

The parameters listed in the first two lists (which greatly influence the financial result) are also called the **main parameters** of the Expert Advisor. These parameters, of course, can be changed and varied, but some nuances should be taken into account and some precautions should be observed, which are discussed below.

This is especially true for the parameters from the first list. Their slightest variation (deviation from the default values) can lead to a completely different behavior of the Expert Advisor, which may not meet the definition of "almost Grail".

'Amount of Lots' parameter and financial risks

The '**Amount of Lots**' parameter is one of the most important EA parameters. Success in trading directly depends on it. The larger the value of this parameter, the greater the profit. But

simultaneously with the growth of this parameter, the risk of losing all funds on the trading deposit also grows.

This parameter has a default value of 0.01, i.e. the lowest value that most brokers usually have. This is done on purpose – to minimize your financial risks.

Of course, it would be desirable to know in advance the most optimal value of this parameter: so that both the risk is smaller and the profit is decent. How to do it? There are two variants. One is long, but universal. Another fast but specific one.

First variant. Long, but universal. "Universal" means that it is suitable for any combination of the main parameters of this Expert Advisor. And it's "long" because it takes a lot of time.

Its essence is as follows. We start with the smallest lot available from your broker. If during the trading process it does not satisfy you, then we increase it a little. If this new lot size also does not satisfy you, then increase it again. And so we repeat until you find the most suitable lot size for you.

Now let's look at this method in more detail. First, let's write out the scale of the gradual increase in the lot. For example, this one:

0.01; 0.02; 0.03; 0.05; 0.07; 0.1; 0.2; 0.3; 0.5; 0.7; 1; 2; 3; 5; 7; 10; etc.

If necessary, you yourself can easily continue this row further.

This series starts at 0.01. But perhaps your broker has a different minimum allowed lot value. For example, 0.1. Well. Then start working with this value.

Also, you may think that the starting value of 0.01 is too small for you. Well. Then choose another (greater) value from this series. But in any case, it is desirable that this value does not exceed 0.1.

When working with the initial lot, adhere to the following rules.

Firstly. Carefully follow the work of the expert for at least one working day (of course, with breaks for food, sleep, etc.). And you don't have to look at the screen all the time. It is enough to glance at it once an hour or so. By the way, the EA gives sound signals at the moment when it performs any trading actions. (To do this, just set the value "on" to the '**Sounds**' parameter.) So you can pay attention to the expert only at the moments of these sound signals.

Secondly. At the end of the trading day, answer two questions:

1) Have you experienced discomfort from the fact that (in your opinion) the expert in the process of trading gave too much loss of funds (drawdown) on the trading account (even if this loss was temporary)?

2) Does this EA bring (in your opinion) too small and insufficient (potential) profit?

Thirdly. If you answered "no" to the first question and "yes" to the second question, then increase the lot (according to the scale given above). If you gave answers exactly the opposite (for the first question – "yes"; for the second – "no"), then reduce the lot. (If it is possible, of course. If it is impossible to reduce the lot because it is already the smallest, then, of course, leave it unchanged.). If you gave any other combination of answers, then leave the lot unchanged. In other words, in this case you have already found the optimal value of the '**Amount of Lots**' parameter that suits you.

On the next business day, you can repeat this procedure and, based on its results, either increase the lot again, or reduce it, or leave it unchanged.

This technique allows not only to find the initial optimal lot, but also to correct it in the future. For example, let's say that you previously answered "yes" to each of the questions. But, then, in the process of trading, your deposit increased. As a result, one day you changed your answer to "no" to the first question. Well. You can be congratulated. Now you can increase the lot by one step (according to the scale above).

Second variant. Fast but specific. "Specific" means that it is suitable only for this Expert Advisor and only if its main parameters have default values. Here, "main parameters" means those parameters listed in the first two parameter lists in the previous section. "Fast" means that you only need to perform two simple actions to get the result.

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First action. Take the amount that you plan to use in trading with this Expert Advisor. For example, \$50,000. And divide this number by 5 (five). It will turn out, for example, \$10,000.

Second action. Divide the number that you received earlier by the size of your broker's standard lot. Typically, this is \$100,000. As a result of division, you will get the number 0.1. This is your initial lot.

It should be noted that this method is very crude. It may well be that it does not suit you. Then it is recommended to clarify the resulting lot size using the previous (first variant) described above. At the same time, not the minimum value (0.01) should be used as the initial lot, but the one that you received using the second method (for example, 0.1).

'Grid Step' and 'Grid Shift' parameters

These parameters were "inherited" by the Expert Advisor from the LRC (Line of Renko on the Chart) indicator. These parameters set the grid of levels at which the Expert Advisor places its orders.

The EA is very sensitive to the '**Grid Step**' parameter. Its decrease leads to a sharp increase in the intensity of trade. For example, if this parameter is equal to the default value (100 points, 1 point = 0.00001), then several dozen (up to a hundred or more) "macroticks" will be detected on average during the day. And each "macrotick" is the triggering of two or three orders. If the value of this parameter is halved (up to 50 points), then the number of "macroticks" can increase to several hundred per day. And this, of course, will greatly increase the intensity of trade. As a result, an Expert Advisor may not have time to respond to a changing situation in a timely manner and effectively manage its orders.

In addition, a decrease in the value of the '**Grid Step**' parameter leads to an increase in the load on the deposit, and hence to an increase in risks. When the value of this parameter is halved (for example, from 100 points to 50), the average load on the deposit and risks increases by the same amount. However, this problem is quite easily solved. You just need to reduce the value of the '**Amount of Lots**' parameter by exactly the same number of times (in this example, by half). In this case, the load on the deposit and the risks will remain at the same level.

There is another issue related to decreasing the value of the '**Grid Step**' parameter. With very small values of this parameter, the distance between the grid levels (and, accordingly, between the Expert Advisor's orders) becomes comparable to the spread value. And this can have a very negative impact on the work of an expert.

General summary on the '**Grid Step**' parameter: it is highly recommended not to use very small values for this parameter (less than 50 – 100 points).

As for the '**Grid Shift**' parameter, as mentioned above, it has almost no effect on the financial results of the Expert Advisor. This parameter simply shifts the entire grid of levels (and, accordingly, orders) up / down as a whole. A positive value of this parameter means an upward shift, a negative value means a downward shift. Thus, the value of this parameter can be anything (within reasonable limits). But it is desirable that the absolute value of this parameter does not exceed the value of the '**Grid Step**' parameter.

Attention!!!

Both of these parameters ('**Grid Step**' and '**Grid Shift**') are strictly forbidden to change "on the fly"! The fact is that such an action will lead to the fact that over time, two grids of orders will be under the control of the expert: the old and the new. And most likely both of these grids will be incompatible with each other. And this, in turn, can lead to serious disorganization of the expert's work.

Therefore, changing these parameters should be carried out strictly in the following sequence:

1) First, you should completely remove the expert from the chart. The words "completely remove" mean not only the removal of the Expert Advisor from the chart, but also the complete closing and deletion of all orders that were previously placed by this Expert Advisor. How to do it correctly is described below in the description of the **'Remove Expert correctly'** parameter (<Ctrl_Q> command).

2) Only after that you should reinstall the Expert Advisor on the chart, specifying the new values of the **'Grid Step'** and **'Grid Shift'** parameters.

'Max Spread' parameter

The main purpose of this parameter is, if possible, to prevent or limit the operation of the Expert Advisor in those periods when there are quote flows with clearly overvalued spreads on the market. So, this parameter specifies the border of the overvalued and normal (not overvalued) spread. If the spread of the current quote is greater than specified in the **'Max Spread'** parameter, then it is considered overvalued. If the current spread is less than or equal to the value specified in this parameter, then such a spread is considered normal.

At the same time, the Expert Advisor does not react to individual cases of abnormal spread, but to their steady flows. If such a flow is detected, the expert will take the following actions:

1) If possible, terminate the current Trading Cycle (if this Cycle is at the earliest stages and if at the same time it can be completed with a "plus" or a very small "minus").

2) When a Trading Cycle is completed, a new Cycle will not start until there is a steady flow of normal spreads.

It is desirable that the value of the **'Max Spread'** parameter corresponded with the value of the **'Grid Step'** parameter. For example, **'Max Spread'** should not exceed 10% of the **'Grid Step'** value.

But if the value of this parameter is made too small (comparable to the typical spread of this instrument), then this can lead to disorganization of the Expert Advisor's work. Therefore, it should be made slightly larger than the typical spread of the instrument that this Expert Advisor works with. For example, you have installed an Expert Advisor on the GBPUSD chart. Let's say that your broker most of the time of the day (more than 20 hours) broadcasts very low spreads for this instrument (from 0 to 5 – 8 points). Sometimes there are rare single surges up to 15 – 25 points. The rest of the time the spreads are much larger (15 – 150 pips). In this case, it is reasonable to set the **'Max Spread'** parameter to 10 points.

You can disable this parameter if you wish. To do this, it is enough to specify a very large value for this parameter (hundreds of thousands of points). Since real spreads (even increased ones) are much smaller, then the expert will consider all spreads (which he will encounter in the course of work) to be normal. In fact, this is equivalent to the fact that the Expert Advisor will not use this parameter in its work.

'Ktat', 'Kfaf' and 'Ktf' parameters

If this EA is supposed to be used "as is", i.e. with default parameters and without delving into the details, then this section (and also the next one) can be skipped. If you want to experiment with these parameters, then you are strongly recommended to read this material in order to more accurately understand the capabilities and limitations of this Expert Advisor.

So, as mentioned earlier, the parameters under consideration are fundamental. Their default values are as follows:

$Ktat = -1$; $Kfaf = -2$; $Ktf = 5$.

In the future, we will use an abbreviated notation for the triple of these parameters, which looks like this:

$K = (-1; -2; 5)$.

Even a slight modification of these parameters compared to the default values can lead to significant deviations in the Expert Advisor's behavior. The fact is that in fact these parameters determine the trading system embedded in the Expert Advisor. If these parameters are different, then the trading system will be different, often not at all similar to the original one. And in most cases, this other trading system cannot be classified as "almost Grail".

Let's consider examples of the most typical trading systems that can be supported by this EA, and which are determined by setting a certain combination of the considered parameters.

First example. Combination of parameters: $K = (-1; 0; 0)$.

This is the so-called Donald – Nathanson system, often used in casinos. In fact, this system uses the "soft martingale" technique in its work. The word "soft" means that in this system the bet (in case of loss) increases gradually (only by the value of the initial bet with each loss). In contrast, in the "classic" ("hard") martingale, the bet doubles with each loss.

The Donald – Nathanson system is based on the assumption that the number of "red" and "black" outcomes is approximately the same. (Of course, for the market, "red" and "black" should be understood as "macroticks" of the price up and/or down.) Therefore, in this system, bets are made against the "skew" (i.e., against the difference between "red" and "black" outcomes) in the hope that this "skew" will sooner or later become zero. For example, if now the "skew" is in favor of the "reds", then the rate will increase in the opposite direction, i.e. in favor of "black" outcomes.

I wonder what result the Donald – Nathanson system shows on standard Patterns (i.e. Patterns #±10, #11, #±21, #22)? And (according to these results) what level of "graility" does this system have?

The answer is this. This system on all Patterns (except Patterns #±10) gives a positive result. On Patterns #±10 the result is negative (moreover: the result is negative and constantly increasing). Consequently, this system, according to purely formal features, belongs to the class "not Grail". Alas, but it is.

Second example. Combination of parameters: $K = (0; -1; 0)$.

This is the so-called Donald – Nathanson anti-system. The prefix "anti" means that in this system bets are made in favor of the "skew", while in the original system, as mentioned above, bets are made against the "skew". In other words, it is assumed that in the course of a random discrete walk, a deviation from zero will be more likely than a return to zero. By the way, this is what mathematical statistics says. There is even a special statistical law on this matter. It's called the "law of the arcsine".

What do you think is the result of the Donald – Nathanson anti-system on standard Patterns (i.e. on Patterns #±10, #11, #±21, #22)? And (according to these results) what level of "graility" does this system have?

The answer is this. This system on all Patterns (except Patterns #±10) gives a positive result. And on Patterns #±10 the result is zero! Consequently, this system, according to purely formal features, belongs to the class of "semi Grail". Yes, this is exactly so, no matter how strange this statement may seem.

Third example. Combination of parameters: $K = (0; 0; +1)$.

This is a kind of nameless trading system. Let's conditionally call it "Struggle of the Pyramids". This system supports two pyramids: one for Buy, the other for Sell. Due to the operation of the arcsine law (which was discussed above), one of the pyramids will sooner or later "victory" the other pyramid. By the way, hence the name of this system. It is impossible to say in advance which of the pyramids will prevail. The probability of "victory" each of them is 50%.

But for the success of this trading system, the arcsine law alone is not enough. There is another fundamental relation for a discrete random walk, which was discussed above. Let's conditionally call it "the law of skew". This law states that with an infinite increase in the number of steps of a random walk, the "skew" s (by which we mean the ratio of the greater deviation D in the

entire history of the walk in one direction to the smaller deviation d in the opposite direction) at least once during the entire time of the walk will reach the ratio 4/1 (this is an approximate value).

And for the "victory" of one of the pyramids over the other, a "skew" of 2.5/1 and even less is often enough (this depends on the value of d).

What about Patterns and "graility"?

Here the situation is next:

- on trend Patterns (#±10 and #±21) the result is positive;
- on a flat Pattern #11, the result constantly fluctuates from 0 to -1;
- on a flat Pattern #22 (phases A and C) the result constantly fluctuates from +1 to -3;
- on the flat Pattern #22 (phase B) the result is unchanged and equal to -2.

Consequently, this system, according to purely formal features, belongs to the class "not Grail".

So we've looked at three examples. Each example is one of the trading systems included in this EA. And each of these systems is not classified very highly: only one of them belongs to the "semi Grail" class, and the other two belong to the "not Grail" class. It would seem that nothing good will come of their joint use.

But it's not. It is enough to correctly select the coefficients of these trading systems, and we will get a trading system of the "almost Grail" class. The correct coefficients are:

$K = (-1; -2; 5)$.

At first glance, it seems that this is impossible: from three not very good systems, to assemble an almost ideal system. In fact, the secret lies in the fact that these three trading systems complement each other very well. They mutually compensate for each other's shortcomings, and at the same time enhance each other's advantages. The result is almost perfect.

'Target Profit Factor for Trading Cycle' parameter

This parameter is one of the fundamental ones and it is very closely related to the three parameters that were considered in the previous section. Therefore, if you want to experiment with this parameter, then the information below will not be superfluous at all.

The purpose of this parameter is very simple. It is assumed that this parameter specifies the value of the profit factor, greater than one. In the process of trading, the Expert Advisor constantly monitors the current value of the profit factor reached at the moment. And as soon as the value of the profit factor becomes equal to or exceeds the value specified in the considered parameter, the Expert Advisor will immediately complete the current Trading Cycle (i.e. close all open market orders and delete all pending orders). After some time, the Expert Advisor will open a new Trading Cycle. Of course, the completion of the Trading Cycle (if it takes place) will bring profit, since at the time of its completion, the profit factor will certainly be greater than one. Thus, this parameter plays the role of a kind of take profit. Only this take profit does not apply to a single open order, but to all orders (including pending ones) involved in the Trading Cycle.

You can, of course, disable this parameter if you wish. To do this, it is enough to specify in it any value less than one. But it is not recommended to do this, because in this case the Trading Cycle will become "infinite". That is, the expert will not interrupt it, regardless of what profits or losses there are at the moment. It will be possible to complete such a Trading Cycle only manually using the <Ctrl_J> command.

The most important thing is that this parameter is a very essential element of the three trading systems that are included in this Expert Advisor and which were discussed in the previous section. If you set this parameter to an incorrect value (by the way, the correct value is different for different trading systems), this can lead to very negative consequences.

Now we will consider what exactly the correct values of this parameter should be on the example of those three trading systems considered earlier in the previous section.

A small warning should be made here. In the following text, there will be quite significant mathematical transformations, as well as mathematical proofs and conclusions that many may find very boring. Well. In this case, it is recommended that you read only the first line of each of the three examples below.

Further, the considered parameter '**Target Profit Factor for Trading Cycle**' for brevity will be referred to as TPF (which means Target Profit Factor).

First example. Combination of parameters: $K = (-1; 0; 0)$; $TPF = 1.571$.

This, as mentioned above, is the Donald – Nathanson system. A feature of this system is that it is relatively easy to calculate the profit factor for it. Moreover, the result of this calculation will be very accurate. We will not consider in detail the methodology for this calculation, but simply give the finished formula:

$$PF = (n - d) / (d^2 - d), \quad (1)$$

where:

PF – theoretical profit factor;

n – is the number of random walk steps (or the number of "macroticks");

d – is the current deviation of the random walk from the zero level.

Here is such a simple formula. At any given time, we know the values of both n and d. It is enough to substitute them into the formula to get the value of the profit factor at a given time.

All this is good, but at different times the values of n, d and PF can be very different. And I would like to know what typical (average) PF value can be expected.

To do this, we first need to slightly simplify formula (1). The fact is that since we are talking about some average value of PF, this means that we must consider very long random walk sequences, with very large n. Only in this case, we can get a large number of random walk variants, each of which will have its own PF value. And this, in turn, will give us the opportunity (having a huge number of PF values) to calculate some average value of PF.

So, we need to determine what will happen to formula (1) if we increase the number n very much. Mathematicians in these cases say: "What will happen if n goes to infinity?". Let's start with the numerator of formula (1). There are two quantities here: n and d. Experiments with the random walk process show that as n grows, so does the value of d. However, the increase in the latter value is very small compared to the former. For example, when n reaches several hundred thousand, the deviation of d will be no more than a few hundred. Therefore, the value of d in the numerator can be neglected (assuming that it simply does not exist). Then only one value n will remain in the numerator.

The situation is similar with the denominator of formula (1). If, for example, the value of d (as mentioned above) is several hundred, then the value of d^2 will be equal to several tens or even hundreds of thousands. Therefore, the value of d (compared to the value of d^2) can be neglected. Then only one quantity d^2 will remain in the denominator.

Thus, formula (1) will take the following form:

$$PF = n / d^2 \quad (2)$$

Once again, this formula is valid "as n tends to infinity". In other words, this is an approximate formula, but the larger n is, the more accurately this formula will correspond to reality. By the way, "infinite n" is not even very necessary. It is enough that n exceed at least several hundreds or even tens.

Many experts in probability theory will say that for a discrete random walk, the value of d is approximately equal to \sqrt{n} . Or, which is the same, $d^2 \approx n$. And this means that the profit factor, according to formula (2), is approximately equal to one. And the equality of the profit factor to one

means that losses are approximately equal to profits, i.e. net profit is almost zero. This allegedly confirms the thesis that it is impossible to make money on a random walk, since the "mathematical expectation" of net profit is zero.

Actually it is not. After all, the approximate equality of n and d^2 does not mean at all that their ratio is equal to one. It only means that this ratio is equal to some constant, which is not necessarily equal to one. And then I would still like to know: what is this constant equal to?

There is an exact and strictly mathematical answer to this question in the article [\[link\]](#). At the end of the article, the following formula is rigorously proved and given:

$$d = \sqrt{2 * n / \pi} \quad (3)$$

After simple algebraic transformations of this formula, it turns out that

$$n / d^2 = \pi / 2 \quad (4)$$

Thus, we finally get that

$$PF = \pi / 2 \approx 1.571 \quad (5)$$

So, it turns out that the profit factor of the Donald – Nathanson system is greater than one, i.e. this system is profitable, or, as mathematicians say, "has a positive mathematical expectation of net profit".

So, the most natural thing that suggests itself is to use the value of the theoretical value of the profit factor, which is equal to $\pi / 2$ or 1.571, as the value of the '**Target Profit Factor for Trading Cycle**' parameter.

Second example. Combination of parameters: $K = (0; -1; 0)$; TPF = 1.545.

This, as mentioned above, is the Donald – Nathanson anti-system. We will not consider in detail the calculation of the profit factor of this system, since it is in many ways similar to the calculation given in the previous example, although a little more complicated.

Thus, as the value of the '**Target Profit Factor for Trading Cycle**' parameter in this case, we take the theoretical value of the profit factor, which is equal to 1.545.

Third example. Combination of parameters: $K = (0; 0; +1)$; TPF = 1.778.

This, as mentioned above, is the so-called "Struggle of the Pyramids" system. Here we will also not consider in detail the calculation of the profit factor of this system, but we will focus on one very important nuance. The fact is that this system is based on the work of the so-called "skew law" (see above in the previous section). Therefore, for her, the best variant for completing the Trading Cycle is to achieve a "skew" $s = D/d$ equal to 4/1.

However, within the framework of this Expert Advisor, such an option for completing the Trading Cycle (for this system) is not provided. The matter is that in this EA this system turned out to be "in the same harness" with the Donald – Nathanson systems, for which the criterion of completion of the Trading Cycle by a certain amount of "skew" is completely unacceptable. Therefore, a certain "unification" has been made in this Expert Advisor, which means that for all systems included in this Expert Advisor, a single criterion for the completion of the Trading Cycle has been adopted. And this criterion is the achievement by the profit factor of a certain value, which may be different for different systems.

So, for this particular system (the "Struggle of the Pyramids" system), at the moment when the "skew" reaches a value equal to 4/1, the value of the profit factor turns out to be approximately equal to $16/9 \approx 1.778$.

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Thus, as the value of the '**Target Profit Factor for Trading Cycle**' parameter in this case, we take the value of the theoretical value of the profit factor, which is equal to 1.778.

General summary for all three examples. So, we have considered three examples of the use of three trading systems included in this EA. If each of these systems is applied separately, then each of them has its own individual value for the criterion for the completion of the Trading Cycle.

I wonder what value this criterion should have if all three trading systems are applied together in the proportions that are set for this Expert Advisor by default:

$K = (-1; -2; +5)$.

The answer is this. The criterion value will be equal to 1.001.

This is a little unexpected. And why is this value so small?

The thing is that this value was selected empirically, and not theoretically. And the main reason why the value is so small is because of the so-called "time factor". Here, the "time factor" refers to the number of "macroticks" or price steps that are spent on each Trading Cycle. And the smaller the number of steps, the better. And this is no coincidence. The fact is that the less "time" spent on the Trading Cycle, the greater the profit factor of this Cycle.

Indeed, let's compare the "lifetime" and profit factors of Trading Cycles formed on different Patterns.

Table 4

Pattern type	Pattern	Duration of the Trading Cycle (in "macroticks")	Trading Cycle net profit (in "macropoints")	Maximum drawdown of the Trading Cycle (according to the balance, in "macropoints")	Trading Cycle profit factor
Simplest	#±10	2	4	0	1.8
Simplest	#11	3	3	3	2.5
Simple	#22 (phase B)	10	1	11	1.071
Simple	#±21 (phase C)	12	1	12	1.02
Complex		>10	>~ 1÷7	>10	>~1.0

As you can see from this Table, the more complex the Pattern, the longer the Trading Cycle lasts on this Pattern, and the smaller the profit factor. From here a conclusion: it is necessary to work whenever possible with more simple Patterns. Then the duration of the Trading Cycle will be shorter, and the profit factor will be higher. By the way, in addition, the drawdown will also be less.

But how to do that? After all, we cannot choose those Patterns with which we want to work and ignore those Patterns with which we do not want to work. All Patterns go in a continuous stream and in random order. At the same time, it is impossible to guess what the next Pattern will be ("bad" or "good").

In such a case, all we can do is complete the Trading Cycle of "bad" Patterns as quickly as possible. It looks something like this: as soon as the slightest profit appears (even one "macropoint"), the Trading Cycle immediately ends.

But how to do that? Very simple. It is necessary to specify the as possible lowest value of the profit factor as a criterion for the end of the Trading Cycle. However, this value must be greater than one. For example: 1.001.

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One doubt may arise here. Yes, indeed, this technique allows you to effectively deal with long-term "bad" Patterns. But the same technique will not allow you to work normally with short-term "good" Patterns, since they will also have a strong limitation on the profit factor. As a result, the entire trading system as a whole will turn out to be very low profitable with a profit factor of 1.001.

Actually it is not. The fact is that the Expert Advisor works only with integer amount of "macroticks" and "macropoints". And he measures the value of the current profit factor only at the moment of completion of the next "macrotick", and only at this moment he makes a decision to continue or terminate the current Trading Cycle. A feature of "good" Patterns (which are shown in the first two rows of Table 4) is that their current profit factors (at the end of the last "macrotick") immediately jump from unprofitable to profitable final values. To make it clearer what we are talking about, let's consider the work of an Expert Advisor with Pattern #11 as an example. See Table 5 below.

Table 5

When the "macrotick" with number ... ended	Expert measures the value of the profit factor	The EA compares the profit factor with the given one	The Expert Advisor decides on the end of the Trading Cycle
1	1.000	$1.000 \geq 1.001$?: no	Cycle must continue
2	0.429	$0.429 \geq 1.001$?: no	Cycle must continue
3	2.500	$2.500 \geq 1.001$?: yes	Cycle must complete

As can be seen from this Table, when moving from the second "macrotick" to the third, the value of the profit factor jumps sharply from the value of 0.429 to the value of 2.500. And although during the formation of the third "macrotick" the values of the profit factor can sequentially take different values (0.999, 1.000, 1.001, 1.002, etc.), the expert does not pay any attention to this until the third "macrotick" is completed. Thus, such a small target value of the profit factor does not affect the decrease in the real profit factor for "good" Patterns.

Therefore, as the value of the '**Target Profit Factor for Trading Cycle**' parameter (in case of using a mixed trading system with parameters $K = (-1; -2; +5)$) we take the value of the profit factor equal to 1.001.

Special parameters 'Mode of EA on restart', 'End the Trading Cycle manually' and 'Remove Expert correctly'

This Expert Advisor is resistant to all sorts of unfavorable situations. To do this, this Expert Advisor permanently stores its current state on the hard disk. This, in particular, allows it to continue working during, for example, power failures. As soon as the power supply is restored and the Expert Advisor is re-launched, it will immediately read its previous state from the disk and thus continue its work from the point where it was previously stopped.

This property of the expert's memory turns out to be useful in other, non-extreme cases. For example, you use an expert around the clock mode. But during the weekend, both the market and the expert, of course, do not work. Moreover, you would like to turn off the computer for the whole weekend. You can safely do this without worrying about the consequences. Just do not forget to turn on the computer (and run the MT4 trading terminal on it) on the eve of the start of trading. For example, late Sunday evening. The EA will restore its state and will calmly wait for the start of trading. As soon as they start, the Expert Advisor will "remember everything" and continue to support the previous Trading Cycle.

But sometimes you still need to make the Expert Advisor "forget" its previous state and start its work from a "clean slate" (i.e. start a new Trading Cycle, "forgetting" about the old one). That's

what the **'Mode of EA on restart'** parameter is for. If you set this parameter to *Start_New_TradeCycle* when (re)launching the Expert Advisor, then it will do just that: it will "forget" about the old Trading Cycle and start a new one.

For example, you decide to interrupt trading for quite a long time (several days or even weeks). Then you remove the expert from the chart. But this is not enough. After all, after it, there will most likely be active orders (both market and pending). They will also have to be closed and/or deleted manually. (We note in brackets that there can be dozens or even hundreds of such orders. Closing and/or deleting such a number of orders manually will be very problematic and very laborious. What to do in such a situation will be described a little later.)

If after that (after a few days or weeks) you try to resume trading and put the Expert Advisor on the chart, you may encounter a somewhat unexpected situation. The point is that the EA "remembers everything" about the old Cycle and those orders that you deleted manually. He will try to take control of them and continue the current Trading Cycle. In this case, for example, some orders will be restored. So, in order for the Expert Advisor not to do such "stupid things" and not to try to manage the Trading Cycle, which has been gone for a long time, it should be started after a long break in the following way (two actions).

1) First, when installing the Expert Advisor on the chart, set the **'Mode of EA on restart'** parameter to *Start_New_TradeCycle*. Then the EA will "forget" about the old Trading Cycle and will not look for orders related to it.

2) Then after that you should immediately restart the Expert Advisor, but at the same time set the **'Mode of EA on restart'** parameter to its usual default value *Continue_Previous_TradeCycle*. Now the Expert Advisor is completely ready for normal operation.

But there is an easier way to remove the expert from the chart. Moreover, this is not only a simple, but also a more correct way to remove an Expert Advisor from the chart.

To do this, use the hot keys <Ctrl_Q>. (Attention! Before using this keyboard shortcut, you should left-click on any empty place on the chart on which the Expert Advisor is installed.) In response to this command, the Expert Advisor (after a corresponding confirmation request) will complete the current Trading Cycle and close and/or delete all orders related to this Cycle. It will take some time. Then (after next confirmation request) the Expert Advisor will automatically leave the chart. At the same time, it will also remember on the disk its state at the time of removal from the chart.

If after that (even after a few days or weeks) you want to resume trading and put the Expert Advisor on the chart, then you won't have any problems. The Expert Advisor "call to remembrance" its previous state, sees at the same time that the previous Trading Cycle has already been completed, and then it will prepare to start a new Trading Cycle in the usual (regular) way. So you won't need any manipulations with the **'Mode of EA on restart'** parameter (as described above).

Please note that this method of removing the Expert Advisor from the chart will work only if the market is not closed and trading is allowed. Otherwise, the <Ctrl_Q> command will hang until the market opens and trading resumes.

And finally, another special command ("not a parameter") called **'End the Trading Cycle manually'**. Its purpose and meaning is very simple. By this command, the EA completes the current Trading Cycle by closing all market orders and deleting all pending orders related to this Cycle. Immediately after that, the Expert Advisor starts a new Trading Cycle.

Theory and reality

When working with this expert, one important thing should be understood. The Expert Advisor in its work focuses on the current financial result of the Trading Cycle, expressed in "macropoints". And these "macropoints" are calculated according to special theoretical formulas. If

the market were perfect, then the calculated theoretical profit would be exactly equal to the real one. But alas, the market is not perfect. There are such things as spread, swap and commission on it. All of them lead to a decrease in the financial result. And then there are such specific things as slippage, false and/or premature execution of orders, etc. However, within the framework of this Expert Advisor, they can almost equally lead to both a decrease and an increase in profit. However, their total contribution is still turn out negative.

Thus, you must understand that "bad" Patterns that bring very little theoretical "plus" (for example, "plus one macropoint") may actually be negative. But, nevertheless, in general, this Expert Advisor ultimately makes a profit, provided that it is used for a sufficiently long time.

Creativity approach

Actually, this Expert Advisor can be used in the "switch on and forget" mode. And it will work fine, coping with many different problems on its own.

But it is still interesting to apply it in some critical and/or special market situations.

First example. For example, there is such a thing as "support / resistance levels". In accordance with classical technical analysis, it is believed that the price tends to either bounce off these levels or break through them. It is believed that the price bounces more often than it breaks. However, many skeptics and critics of technical analysis believe that in fact, a rebound and a breakdown are made with a probability of 50% to 50%. And therefore, allegedly, nothing can be reliably predicted.

But this does not interest us now. Let's just see how the expert behaves at this very level of support or resistance. To do this, simply launch the Expert Advisor (with default parameters) right at this level. (Let's note in brackets that this assumes that the Expert Advisor will be launched in its initial state. This means that at the time of launch it must complete its previous Trading Cycle. To achieve this, it is enough to use the <Ctrl_Q> command described above.)

And then there will be the most interesting. Let's say that you predicted a rebound from the level, and it really happened. And this rebound was bright and clear. In this case, the Expert Advisor will work with a profit, since it will mainly use the trend system.

But, what if instead of a rebound (which you expected) there will be a pronounced breakdown of the level? Nothing bad will happen. The expert doesn't care where the price goes. The trend system will work for him again, and the result will be profitable.

And what if there is no breakdown or rebound? And the price will freeze in uncertainty at this level. More specifically, the price will make small price fluctuations at this level. As some traders say: "the price crept along the level". In this case, the following will happen:

- If these price fluctuations are very small, then the expert will practically not react to them. And thus he will not earn anything, but he will not lose either.

- If these price fluctuations are slightly larger, then the flat and anti-flat systems will work in the Expert Advisor. And the expert will earn a little.

- And if these price fluctuations are even larger, forming some "microtrend" up and down movements, then the EA will work a trend system that will earn on each of these "microtrends".

But what if there is some kind of "hybrid" case: first, the price "creeped along the level for a long time", and then abruptly and unpredictably moved in one direction (towards a rebound or towards a breakdown)? And everything will be fine again. First, the EA will make money on price fluctuations and "microtrends" (if any), and then it will also make money on a sharp price movement (in any direction).

But what if the price at this level makes sharp deceptive movements either up or down, and at the same time increasing the amplitude of these sharp multidirectional movements? That is, in other words, a figure will be formed, which in technical analysis is called an "expanding triangle". This is the most difficult test for an expert. As long as this "triangle" is formed, the Expert Advisor will be in drawdown. But "expanding triangles" don't last forever. According to technical analysis,

such a "triangle" cannot have more than 5 expansion segments. After that, it either degenerates into a long flat, or into a sharp price movement in any direction (up or down). In any of these scenarios, the Expert Advisor will gradually come out of the drawdown and even earn a small "plus".

But what if... if... Alas, the knowledge and imagination of the author of this text about what else the market can do is exhausted. But maybe the readers know about the market "something it" that can prevent this Expert Advisor from making money? Then the author would be interested to know about it.

But in fact, no matter what happens at the price level, the Expert Advisor will always either make money or find a way out of a difficult situation.

Second example. There are regular and quite interesting critical events on the market. We are talking about the release or publication of official economic news. Such, for example, as messages about changes in interest rates, the publication of important economic indicators (including the famous "Nonfarm payrolls"), etc. Why are these events interesting?

The fact is that these events are accompanied by very powerful and significant price movements. And plus to this, we absolutely know the date and time of the release of the news, and, accordingly, date and time of these price surges. Just an ideal situation to make money: we know that there will be a sharp price movement, and we know exactly when it will happen.

But not everything is so clear. It is not for nothing that many traders are afraid of the news and try (if possible) to close their positions before they appear. It's all about the unpredictability of market behavior at this moment. The price may move sharply in one direction, but not at all in the one that was expected. The price can make several sharp movements in different directions, knocking out all conceivable and inconceivable stop losses. And, finally, the price can react very sluggishly, practically remaining almost in place. So the fears of some traders are well founded.

But you have nothing to be afraid of. Because you have an expert of the "almost Grail" class. Put it on the chart (with default parameters) about 10 minutes before the release of some very important news. And see what happens next.

You probably already know (or guess) what will happen next. Indeed, in any case, the price does not have so many variants for behavior in critical situations:

- the price can move very sharply (and almost without rollback) in one direction (in any direction);
- the price can make a lot of sharp multidirectional movements;
- the price can "crawl along the level" ("flat");
- the price can make a series of multidirectional movements with increasing amplitude ("expanding triangle");
- the price can do all the actions listed above in any sequence.

Well, how the expert will react to all these variants has already been discussed in detail above in the previous example.

In any case the end result will come down to the next variants:

- expert will win a very lot;
- expert will win, but very little;
- the expert will fall into a drawdown, but will still get out of it with a minimum "plus".

Third example. In addition to news releases, there are other regular events on the market that can be accompanied by significant price movements. For example, the start of the European trading session (around 9:00 GMT+2). Watch the market at this time. Exactly at 9:00 (not always, of course, but quite often) there is a clear revival: volumes are growing, and the price is moving. Essential price movement. And quite often this movement is sharp and unidirectional (i.e. impulsive).

And this is exactly the situation that is very good for our Expert Advisor.

Put it on the chart about 10–15 minutes before the start of the European session. And see what happens next. And then (as you may already guess) everything will be the same as described

in the two previous examples: either the situation will turn out to be favorable for the expert, or vice versa – unfavorable.

In the first case, the expert will make good money. In the second case, the Expert Advisor will fall into a drawdown, from which it will inevitably exit with a minimum "plus".

General summary for all three examples. So, we have considered three examples of the creative application of this Expert Advisor. As you understand, all "this creativity" comes down to finding some extreme and/or critical situation in the market, which promises a very good price movement. And it is at this moment that the Expert Advisor is launched into operation.

In fact, in the three examples above, some variants of such extreme critical situations were shown:

- rebound / breakdown of support / resistance lines;
- release of important news;
- the beginning of the European trading session.

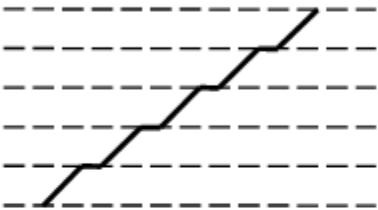
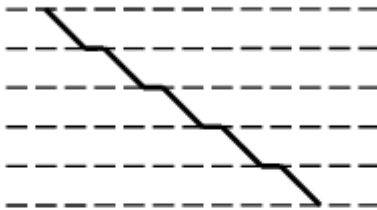
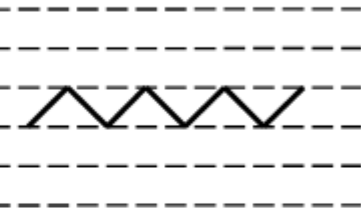
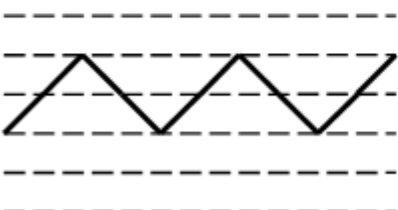
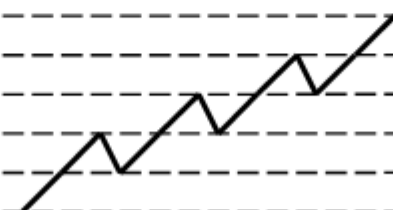
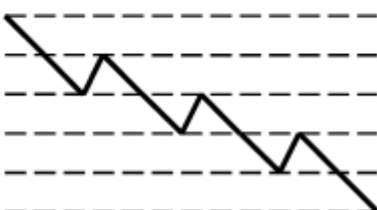
You can easily add to this list. For example, it can include various figures of technical analysis (such as "Head and Shoulders", "Symmetrical Triangle", etc.). The element of creativity will be to determine for each of these figures the moment the expert is included in the work. For the "Head and Shoulders" figure, for example, such a moment (perhaps) is a breakdown of the so-called "neck line".

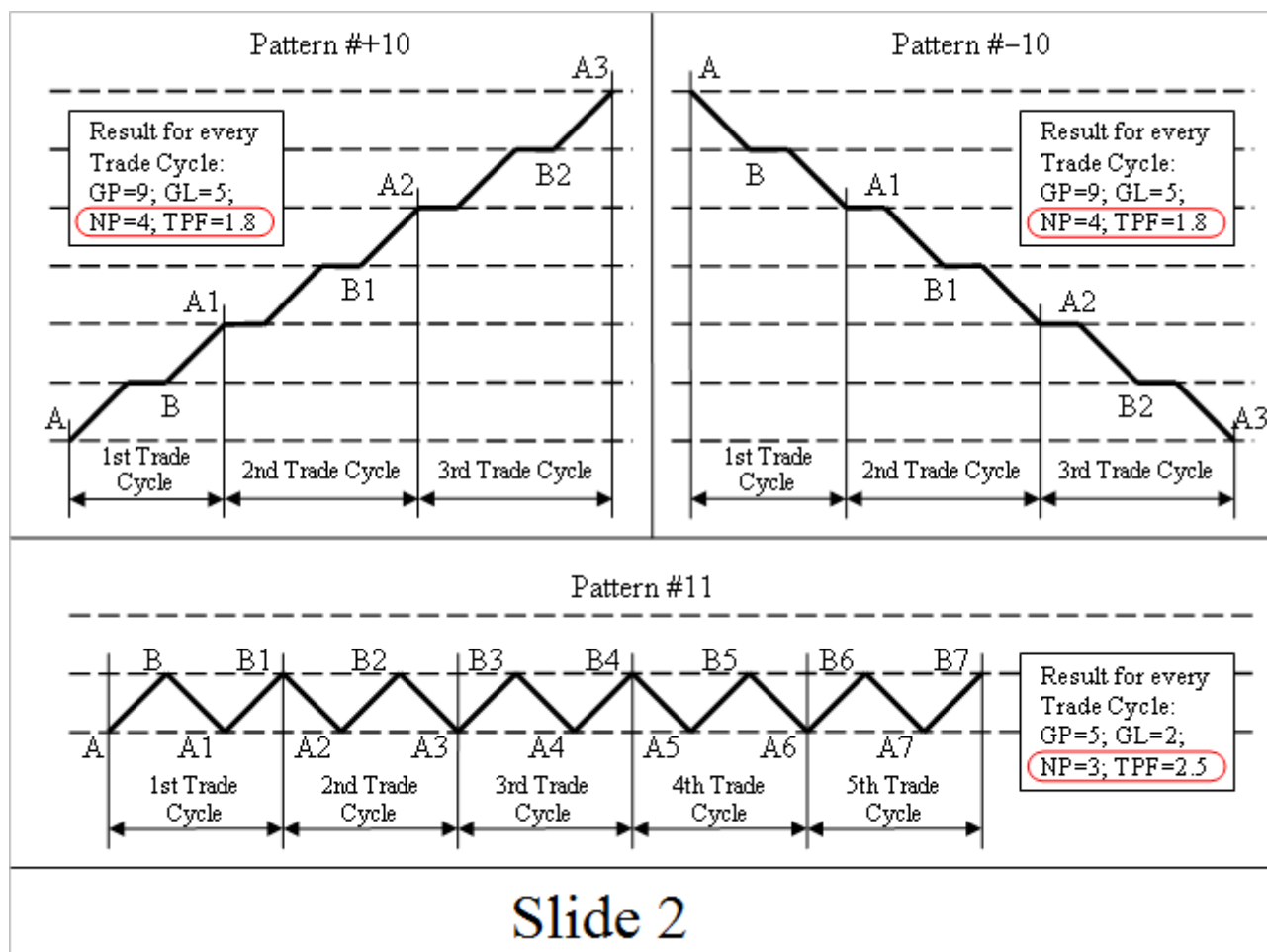
Another direction for creativity is the use of various signals of classical technical analysis (for example, the crossing of moving averages, the divergence of oscillators, etc., etc.).

And, finally, one more thing. Every trader (no matter how rationalist he may be) from time to time has a feeling that can be expressed in words like this: "Well, now it will begin!". Yes, yes, this is nothing but intuition. Sometimes it turns out to be successful, and sometimes it doesn't. But in any case, you already know how to test your own intuition. You just need to put the expert on the chart. And then it doesn't matter if your intuition failed you or not. In any case, there will be no catastrophe.

So successes to you and good luck in your creative search.

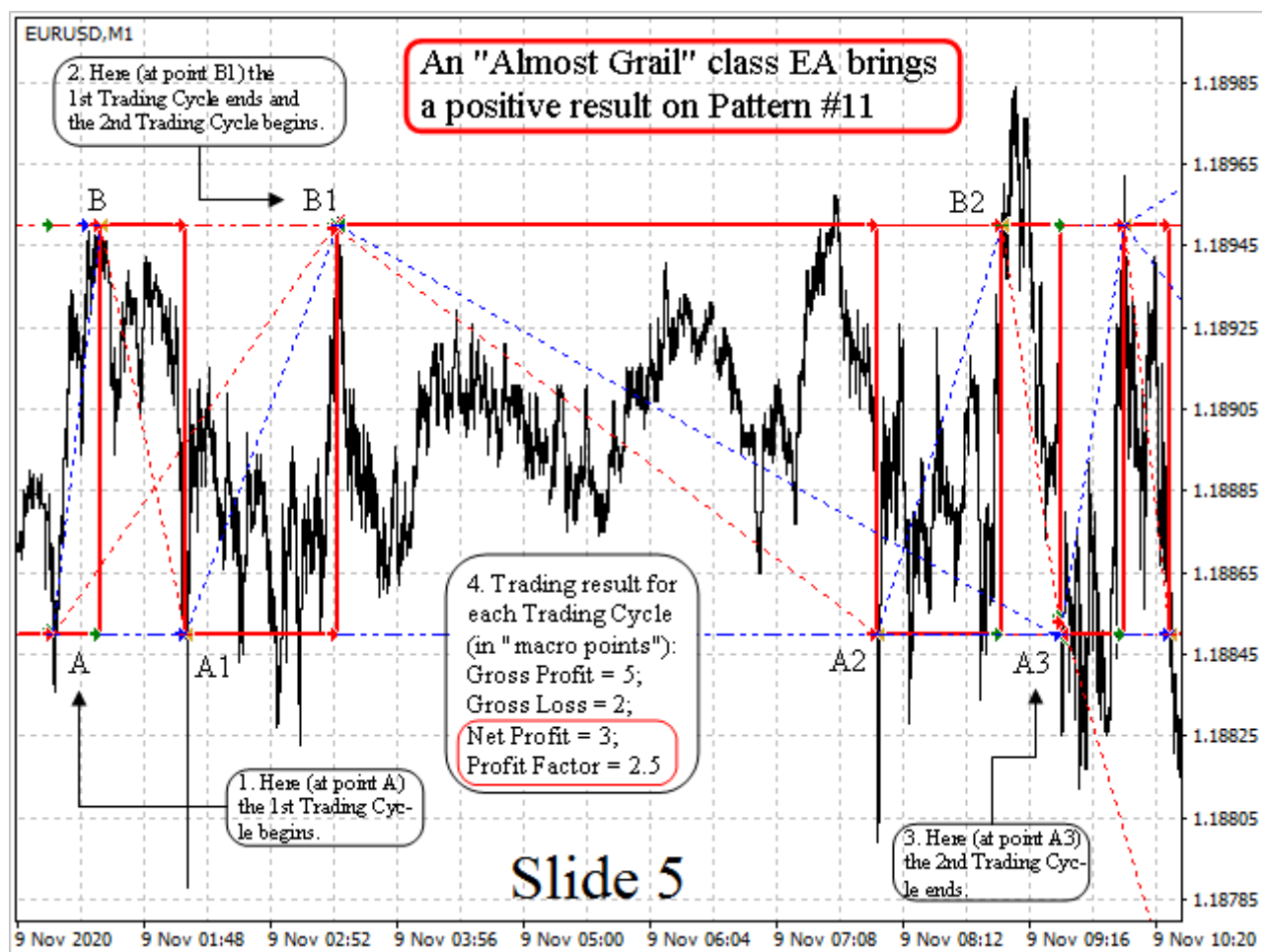
Appendix A. Slides

<div> "Almost Grail" is an Expert Advisor that gives a positive result <u>on all the Patterns</u> below </div>		
Pattern #+10 	Pattern #-10 	Pattern #11 
Pattern #22 	Pattern #+21 	Pattern #-21 
Slide 1		

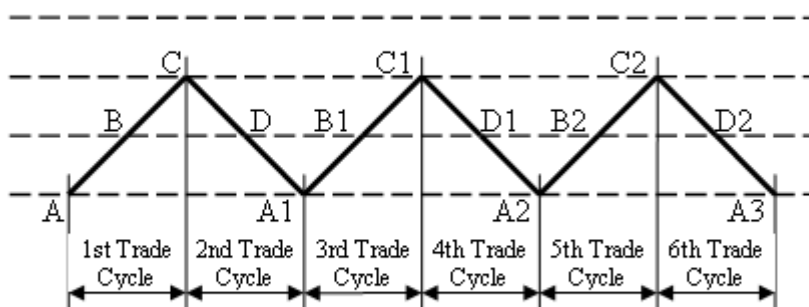






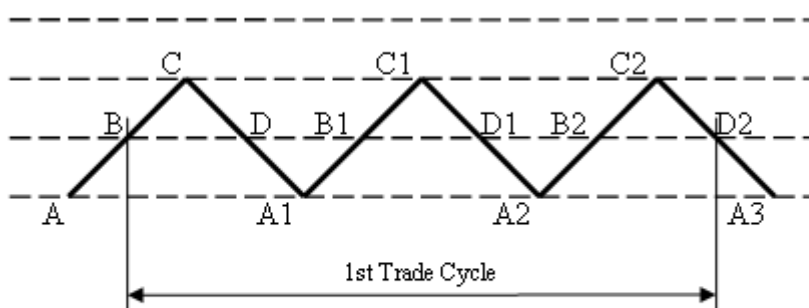


Pattern #22 (phase A or C)



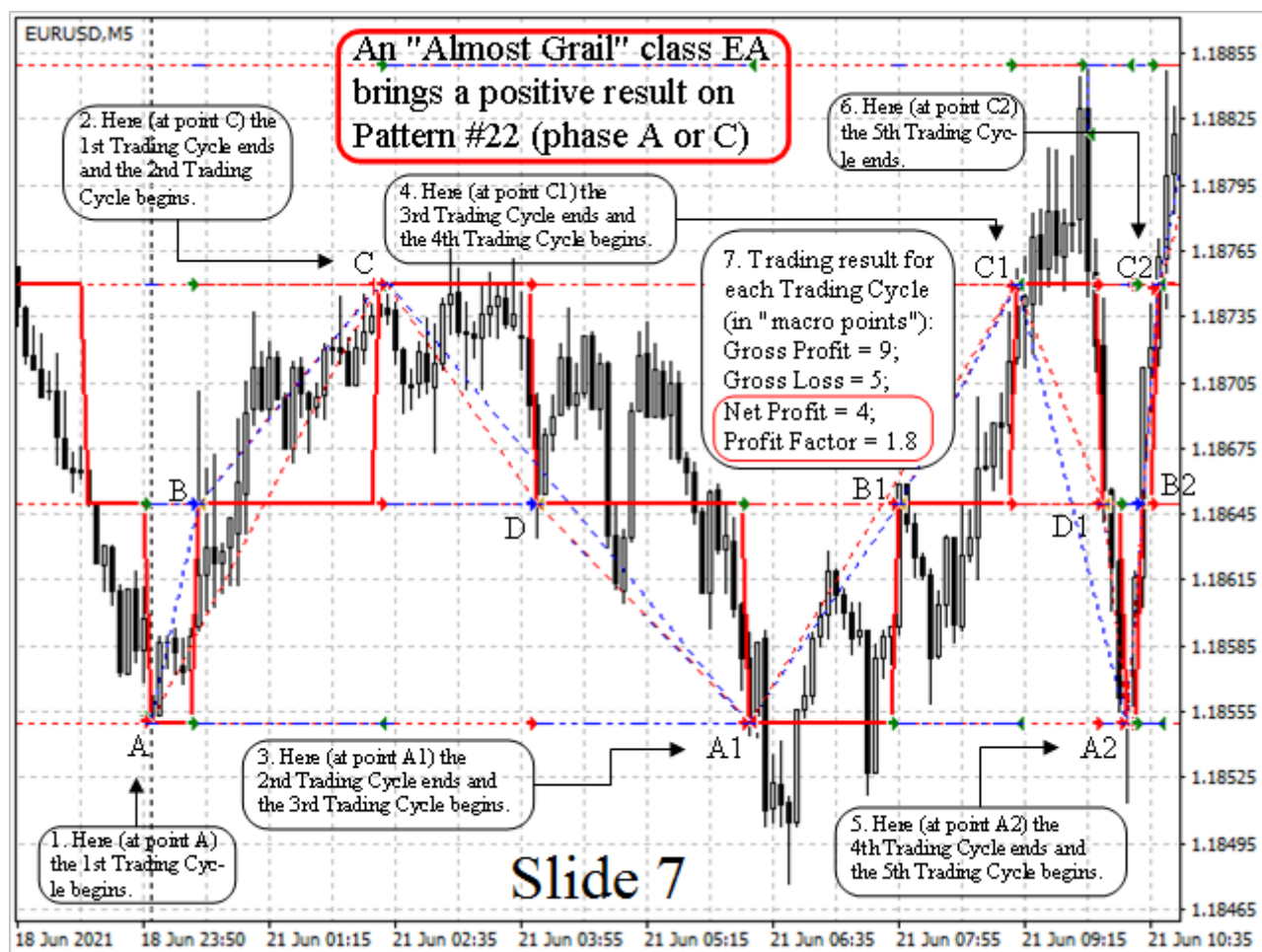
Result for every
Trade Cycle:
GP=9; GL=5;
NP=4; TPF=1.8

Pattern #22 (phase B or D)

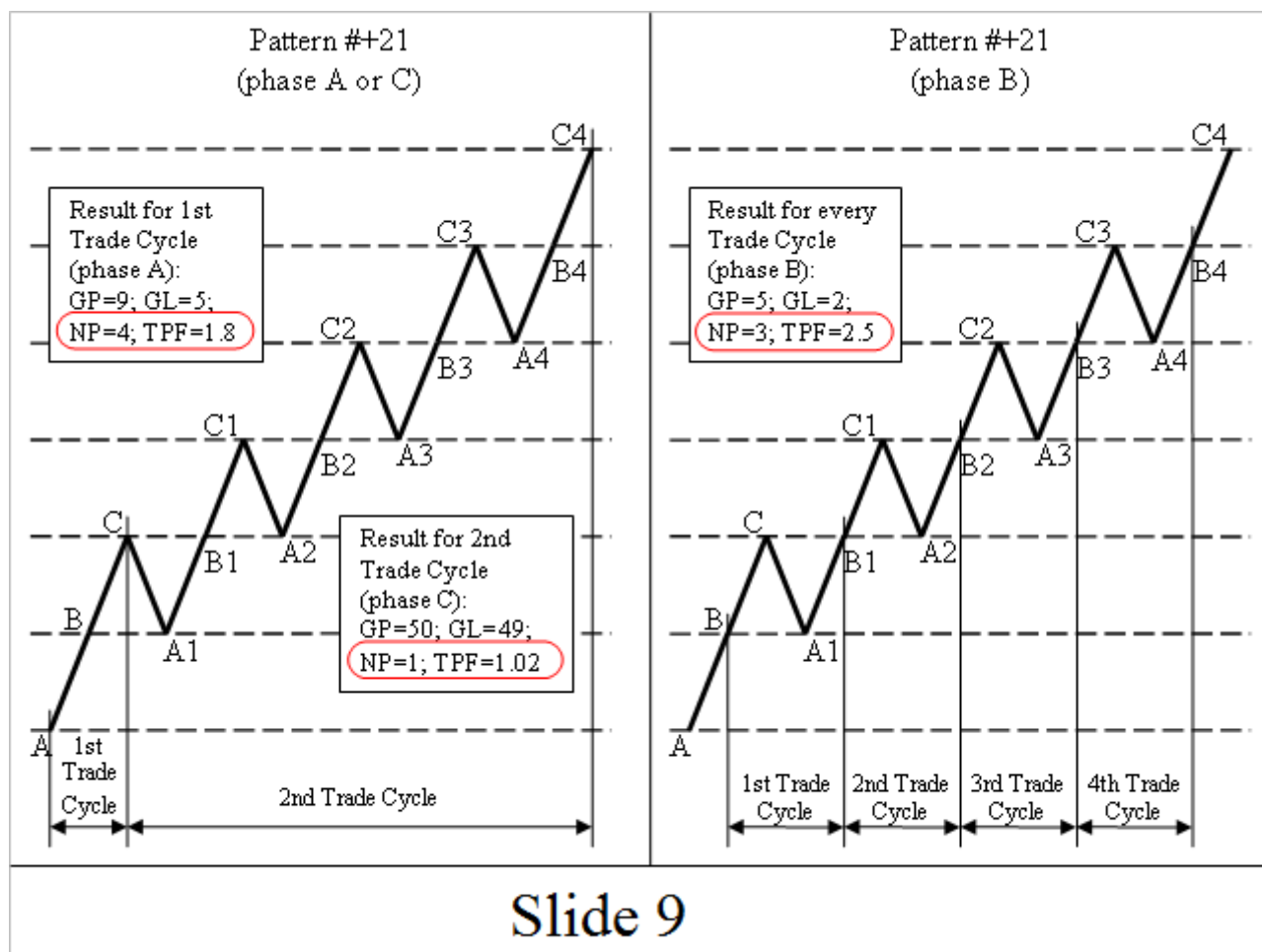


Result for every
Trade Cycle:
GP=15; GL=14;
NP=1; TPF=1.071

Slide 6

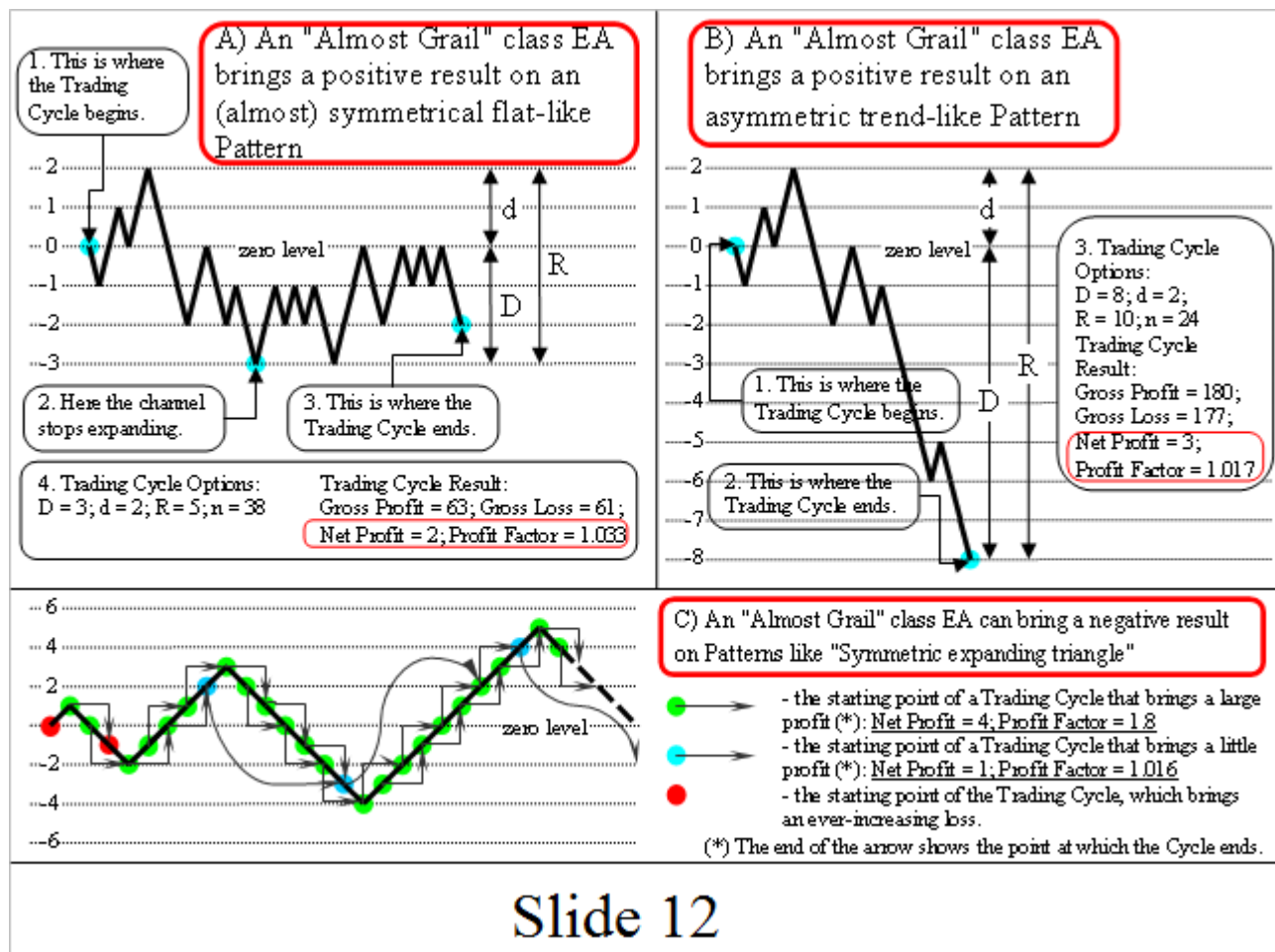












Appendix B. Strategy Tester Reports

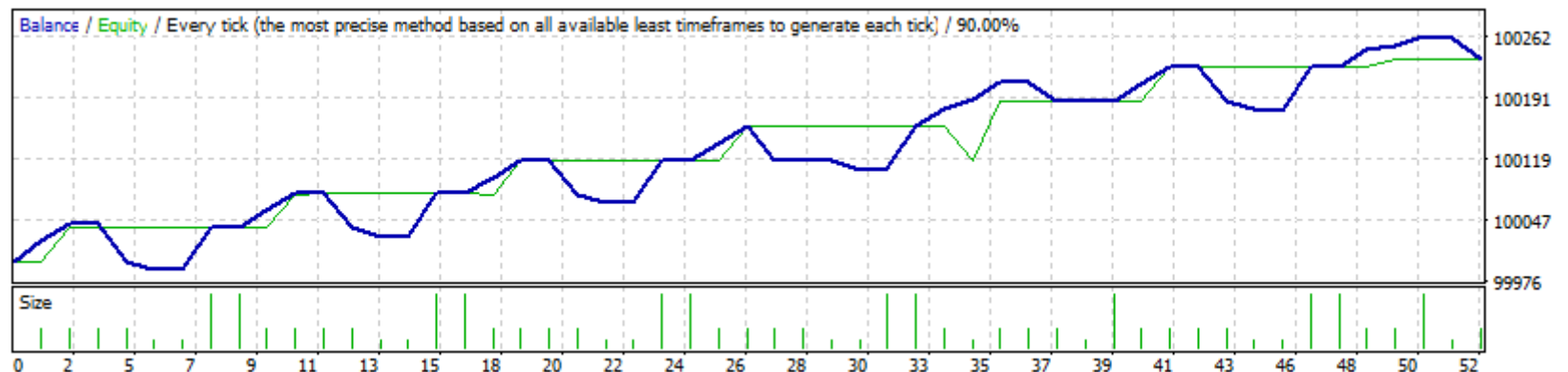
Strategy Tester Report

YY_RRRobot

MT4 Demo Server (Build 1353)

**[for situation
shown on slide 3:
Pattern #+10]**

Symbol	EURUSD (Euro vs US Dollar)			
Period	5 Minutes (M5) 2021.04.23 00:00 - 2021.04.23 23:50 (2021.04.23 - 2021.04.24)			
Model	Every tick (the most precise method based on all available least timeframes)			
Parameters	Magic=777; Step=100; Shift=50; FixLots=0.1; Max_Slip=3; Max_Spread=10; Ktat=-1; Kfaf=-2; Ktf=5; Target_PF_for_TCycle=1.001; Mode_EA_Restart=1; PermanentDataSaving=true; FatalErrorResponse=1; Sounds=1; Cmd_End_TCycle=0; Cmd_Remove_Exp=0;			
Bars in test	1287	Ticks modelled	33471	Modelling quality 90.00%
Mismatched charts errors	0			
Initial deposit	100000.00	Spread	1	
Total net profit	236.80	Gross profit	541.30	Gross loss -304.50
Profit factor	1.78	Expected payoff	4.55	
Absolute drawdown	27.30	Maximal drawdown	106.90 (0.11%)	Relative drawdown 0.11% (106.90)
Total trades	52	Short positions (won %)	22 (27.27%)	Long positions (won %) 30 (90.00%)
		Profit trades (% of total)	33 (63.46%)	Loss trades (% of total) 19 (36.54%)
		Largest profit trade	50.50	loss trade -44.20
		Average profit trade	16.40	loss trade -16.03
		Maximum consecutive wins (profit in money)	6 (101.20)	consecutive losses (loss in money) 3 (-54.40)
		Maximal consecutive profit (count of wins)	101.20 (6)	consecutive loss (count of losses) -54.40 (3)
		Average consecutive wins	4	consecutive losses 2



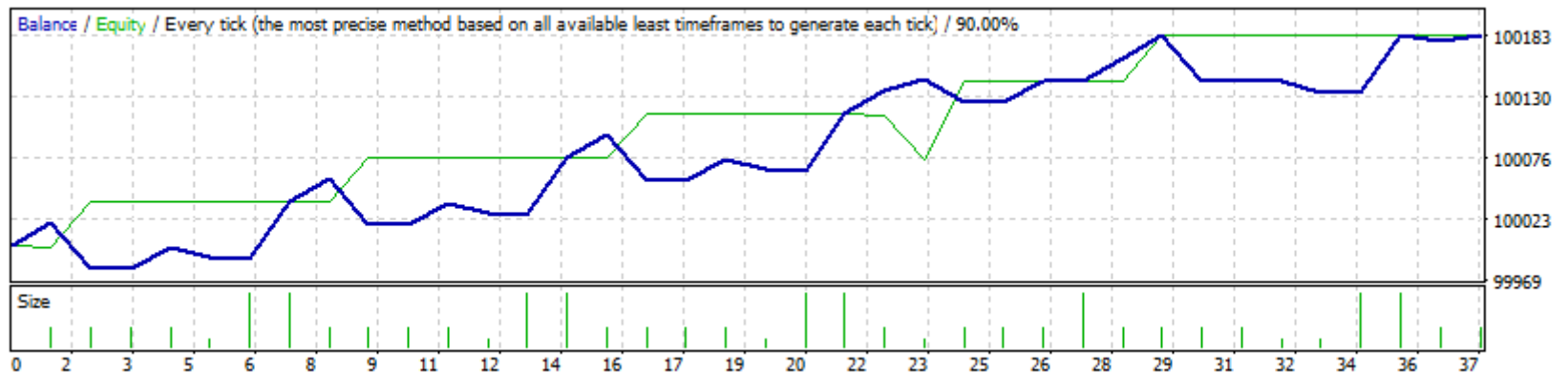
Strategy Tester Report

YY_RRRobot

MT4 Demo Server (Build 1353)

[for situation shown on slide 4: Pattern #–10]

Symbol	EURUSD (Euro vs US Dollar)			
Period	5 Minutes (M5) 2021.03.23 00:00 - 2021.03.23 23:55 (2021.03.23 - 2021.03.24)			
Model	Every tick (the most precise method based on all available least timeframes)			
Parameters	Magic=777; Step=100; Shift=50; FixLots=0.1; Max_Slip=3; Max_Spread=10; Ktat=-1; Kfaf=-2; Ktf=5; Target_PF_for_TCycle=1.001; Mode_EA_Restart=1; PermanentDataSaving=true; FatalErrorResponse=1; Sounds=1; Cmd_End_TCycle=0; Cmd_Remove_Exp=0;			
Bars in test	1289	Ticks modelled	50826	Modelling quality 90.00%
Mismatched charts errors	0			
Initial deposit	100000.00	Spread	1	
Total net profit	183.90	Gross profit	414.70	Gross loss -230.80
Profit factor	1.80	Expected payoff	4.97	
Absolute drawdown	34.50	Maximal drawdown	70.00 (0.07%)	Relative drawdown 0.07% (70.00)
Total trades	37	Short positions (won %)	25 (64.00%)	Long positions (won %) 12 (16.67%)
		Profit trades (% of total)	18 (48.65%)	Loss trades (% of total) 19 (51.35%)
		Largest profit trade	50.50	loss trade -40.60
		Average profit trade	23.04	loss trade -12.15
		Maximum consecutive wins (profit in money)	3 (79.90)	consecutive losses (loss in money) 2 (-40.80)
		Maximal consecutive profit (count of wins)	79.90 (3)	consecutive loss (count of losses) -40.80 (2)
		Average consecutive wins	2	consecutive losses 2



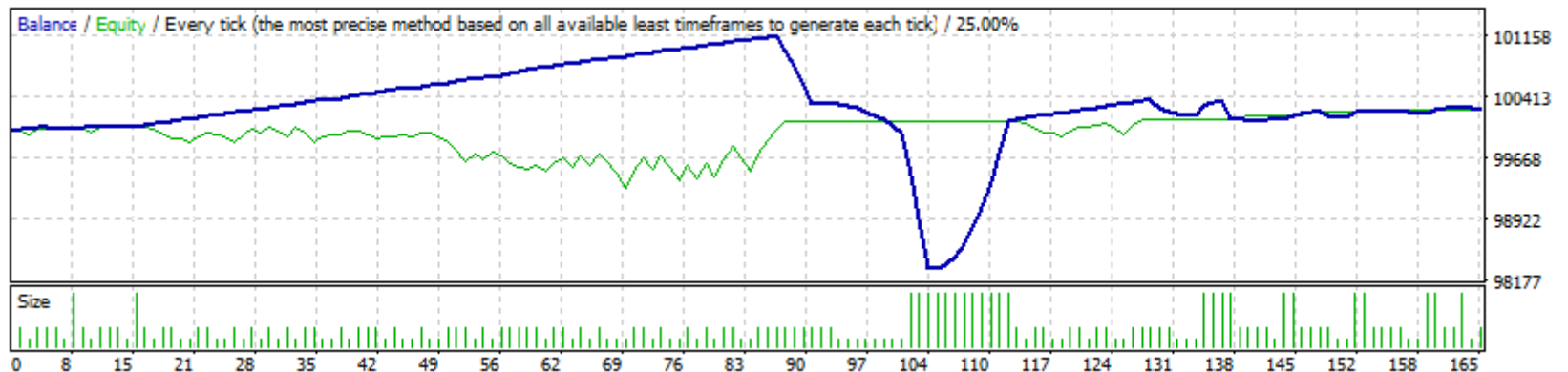
Strategy Tester Report

YY_RRRobot

MT4 Demo Server (Build 1353)

[for situation shown on slide 5: Pattern #11]

Symbol	EURUSD (Euro vs US Dollar)			
Period	1 Minute (M1) 2020.11.09 00:01 - 2020.11.10 23:59 (2020.11.09 - 2020.11.11)			
Model	Every tick (the most precise method based on all available least timeframes)			
Parameters	Magic=777; Step=100; Shift=50; FixLots=0.1; Max_Slip=3; Max_Spread=10; Ktat=-1; Kfaf=-2; Ktf=5; Target_PF_for_TCycle=1.001; Mode_EA_Restart=1; PermanentDataSaving=true; FatalErrorResponse=1; Sounds=1; Cmd_End_TCycle=0; Cmd_Remove_Exp=0;			
Bars in test	3881	Ticks modelled	152133	Modelling quality 25.00%
Mismatched charts errors	0			
Initial deposit	100000.00	Spread	1	
Total net profit	260.52	Gross profit	3718.77	Gross loss -3458.25
Profit factor	1.08	Expected payoff	1.58	
Absolute drawdown	713.00	Maximal drawdown	788.00 (0.79%)	Relative drawdown 0.79% (788.00)
Total trades	165	Short positions (won %)	85 (81.18%)	Long positions (won %) 80 (70.00%)
		Profit trades (% of total)	125 (75.76%)	Loss trades (% of total) 40 (24.24%)
		Largest profit trade	400.19	loss trade -602.90
		Average profit trade	29.75	loss trade -86.46
		Maximum consecutive wins (profit in money)	73 (1116.71)	consecutive losses (loss in money) 12 (-2022.10)
		Maximal consecutive profit (count of wins)	2041.48 (24)	consecutive loss (count of losses) -2022.10 (12)
		Average consecutive wins	9	consecutive losses 3



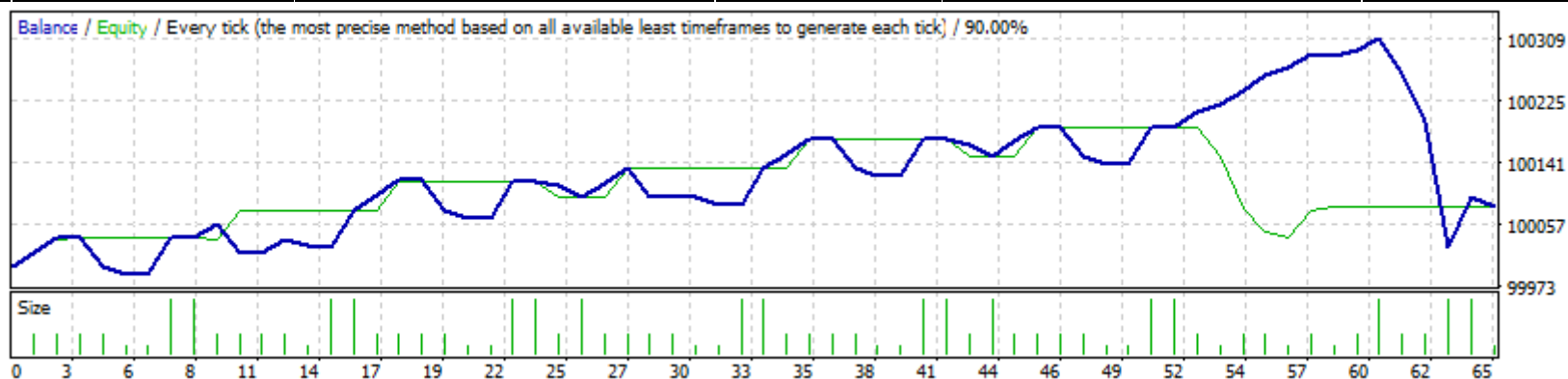
Strategy Tester Report

YY_RRRobot

MT4 Demo Server (Build 1353)

[for situation shown on slide 7: Pattern #22 (phase A or C)]

Symbol	EURUSD (Euro vs US Dollar)			
Period	5 Minutes (M5) 2021.06.21 00:00 - 2021.06.21 23:55 (2021.06.21 - 2021.06.22)			
Model	Every tick (the most precise method based on all available least timeframes)			
Parameters	Magic=777; Step=100; Shift=50; FixLots=0.1; Max_Slip=3; Max_Spread=10; Ktat=-1; Kfaf=-2; Ktf=5; Target_PF_for_TCycle=1.001; Mode_EA_Restart=1; PermanentDataSaving=true; FatalErrorResponse=1; Sounds=1; Cmd_End_TCycle=0; Cmd_Remove_Exp=0;			
Bars in test	1289	Ticks modelled	68669	Modelling quality 90.00%
Mismatched charts errors	0			
Initial deposit	100000.00	Spread	1	
Total net profit	82.10	Gross profit	730.30	Gross loss -648.20
Profit factor	1.13	Expected payoff	1.26	
Absolute drawdown	21.30	Maximal drawdown	183.80 (0.18%)	Relative drawdown 0.18% (183.80)
Total trades	65	Short positions (won %)	29 (34.48%)	Long positions (won %) 36 (75.00%)
		Profit trades (% of total)	37 (56.92%)	Loss trades (% of total) 28 (43.08%)
		Largest profit trade	67.50	loss trade -168.00
		Average profit trade	19.74	loss trade -23.15
		Maximum consecutive wins (profit in money)	8 (149.80)	consecutive losses (loss in money) 3 (-282.40)
		Maximal consecutive profit (count of wins)	149.80 (8)	consecutive loss (count of losses) -282.40 (3)
		Average consecutive wins	3	consecutive losses 2



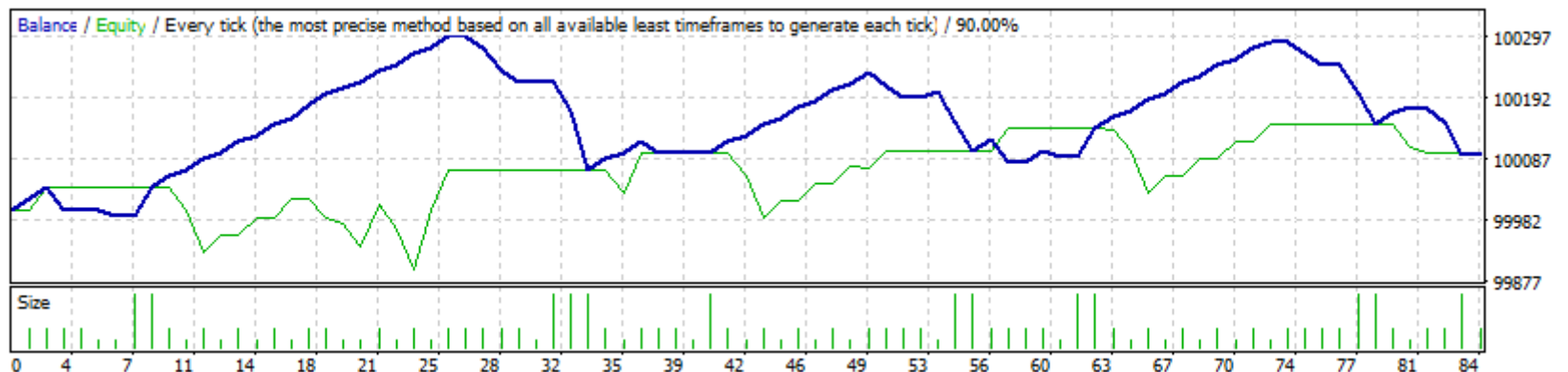
Strategy Tester Report

YY_RRRobot

MT4 Demo Server (Build 1353)

[for situation shown on slide 8: Pattern #22 (phase B or D)]

Symbol	EURUSD (Euro vs US Dollar)			
Period	5 Minutes (M5) 2022.02.07 00:00 - 2022.02.08 23:55 (2022.02.07 - 2022.02.09)			
Model	Every tick (the most precise method based on all available least timeframes)			
Parameters	Magic=777; Step=100; Shift=50; FixLots=0.1; Max_Slip=3; Max_Spread=10; Ktat=-1; Kfaf=-2; Ktf=5; Target_PF_for_TCycle=1.001; Mode_EA_Restart=1; PermanentDataSaving=true; FatalErrorResponse=1; Sounds=1; Cmd_End_TCycle=0; Cmd_Remove_Exp=0;			
Bars in test	1577	Ticks modelled	112770	Modelling quality 90.00%
Mismatched charts errors	0			
Initial deposit	100000.00	Spread	1	
Total net profit	98.81	Gross profit	818.61	Gross loss -719.80
Profit factor	1.14	Expected payoff	1.18	
Absolute drawdown	147.50	Maximal drawdown	212.30 (0.21%)	Relative drawdown 0.21% (212.30)
Total trades	84	Short positions (won %)	46 (69.57%)	Long positions (won %) 38 (65.79%)
		Profit trades (% of total)	57 (67.86%)	Loss trades (% of total) 27 (32.14%)
	Largest	profit trade	50.00	loss trade -101.00
	Average	profit trade	14.36	loss trade -26.66
	Maximum	consecutive wins (profit in money)	20 (310.00)	consecutive losses (loss in money) 5 (-140.90)
	Maximal	consecutive profit (count of wins)	310.00 (20)	consecutive loss (count of losses) -150.50 (2)
	Average	consecutive wins	4	consecutive losses 2



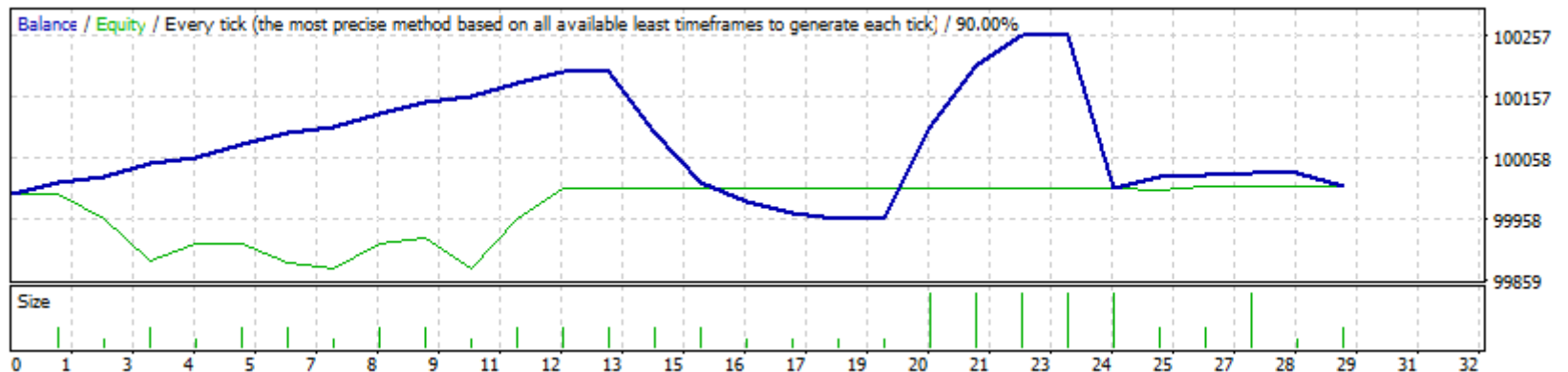
Strategy Tester Report

YY_RRRobot

MT4 Demo Server (Build 1353)

[for situation
shown on slide 10:
Pattern #+21
(phase C)]

Symbol	EURUSD (Euro vs US Dollar)			
Period	5 Minutes (M5) 2021.04.01 00:00 - 2021.04.01 23:55 (2021.04.01 - 2021.04.02)			
Model	Every tick (the most precise method based on all available least timeframes)			
Parameters	Magic=777; Step=100; Shift=50; FixLots=0.1; Max_Slip=3; Max_Spread=10; Ktat=-1; Kfaf=-2; Ktf=5; Target_PF_for_TCycle=1.001; Mode_EA_Restart=1; PermanentDataSaving=true; FatalErrorResponse=1; Sounds=1; Cmd_End_TCycle=0; Cmd_Remove_Exp=0;			
Bars in test	1289	Ticks modelled	43002	Modelling quality 90.00%
Mismatched charts errors	0			
Initial deposit	100000.00	Spread	1	
Total net profit	11.60	Gross profit	526.30	Gross loss -514.70
Profit factor	1.02	Expected payoff	0.40	
Absolute drawdown	171.70	Maximal drawdown	181.20 (0.18%)	Relative drawdown 0.18% (181.20)
Total trades	29	Short positions (won %)	13 (30.77%)	Long positions (won %) 16 (100.00%)
		Profit trades (% of total)	20 (68.97%)	Loss trades (% of total) 9 (31.03%)
		Largest profit trade	150.00	loss trade -250.50
		Average profit trade	26.31	loss trade -57.19
		Maximum consecutive wins (profit in money)	13 (199.80)	consecutive losses (loss in money) 6 (-240.80)
		Maximal consecutive profit (count of wins)	300.00 (4)	consecutive loss (count of losses) -250.50 (1)
		Average consecutive wins	7	consecutive losses 3



Strategy Tester Report

YY_RRRobot

MT4 Demo Server (Build 1353)

[for situation
shown on slide 11:
Pattern #+21
(phase B)]

Symbol	EURUSD (Euro vs US Dollar)			
Period	5 Minutes (M5) 2020.11.30 00:00 - 2020.11.30 23:55 (2020.11.30 - 2020.12.01)			
Model	Every tick (the most precise method based on all available least timeframes)			
Parameters	Magic=777; Step=100; Shift=50; FixLots=0.1; Max_Slip=3; Max_Spread=10; Ktat=-1; Kfaf=-2; Ktf=5; Target_PF_for_TCycle=1.001; Mode_EA_Restart=1; PermanentDataSaving=true; FatalErrorResponse=1; Sounds=1; Cmd_End_TCycle=0; Cmd_Remove_Exp=0;			
Bars in test	1289	Ticks modelled	45800	Modelling quality 90.00%
Mismatched charts errors	0			
Initial deposit	100000.00	Spread	1	
Total net profit	210.20	Gross profit	467.50	Gross loss -257.30
Profit factor	1.82	Expected payoff	3.97	
Absolute drawdown	60.90	Maximal drawdown	86.60 (0.09%)	Relative drawdown 0.09% (86.60)
Total trades	53	Short positions (won %)	29 (58.62%)	Long positions (won %) 24 (54.17%)
		Profit trades (% of total)	30 (56.60%)	Loss trades (% of total) 23 (43.40%)
		Largest profit trade	49.50	loss trade -40.80
		Average profit trade	15.58	loss trade -11.19
		Maximum consecutive wins (profit in money)	5 (49.80)	consecutive losses (loss in money) 2 (-41.00)
		Maximal consecutive profit (count of wins)	98.90 (4)	consecutive loss (count of losses) -41.00 (2)
		Average consecutive wins	2	consecutive losses 2

