

Vassiliev's Law. There's No Chaos Anymore.

Any science is the statistics of process behaviour and interaction. Financial market is an ideal testing ground for studying the behavior of processes. The following Law has been discovered by the author through studying the price behaviour of Gazprom shares over the period from October 1998 to December 1999, and through studying the price dynamics of the US Dollar against the Japanese Yen in the Forex market during the period from December 1998 to December 1999. While working at the Law, the author has applied his knowledge of physics, radioelectronics, programming, geometry, music, biology and psychology.



Vassiliev's Law – the law of basic trajectories.

Author of the Law: Andrey Vasilievich Vassiliev.

Application of the Law: High accuracy simulation of the behaviour of any complex processes in nature.

According to the Law, each process in nature has its fate which cannot be changed in any way. The fate of each process may be described in terms of a unique sequence of basic trajectories along which its properties change.

History of the Law: The Law is based on the observation that a price trendline during a trading session on the foreign exchange and stock market may be visually divided into five parts of equal duration. The basic principle of the Law was described in March 1999. The full composition of trajectories was determined in September 1999.

Wording of the Law: Changes in the properties of any process (phenomenon) in nature take place along **5 (Five)** basic trajectories: **A, B, C, D** and **E**. Each of the five basic trajectories may have two basic directions, upwards and downwards.

Each basic trajectory of **T**-duration consists of five parts (steps), sequentially connected with one another, being the basic trajectories of a certain direction, each of $\sim T/5$ -duration.

The five basic trajectories of **T**-duration are sequentially connected with one another in a manner that is determined by the composition of one of the basic trajectories **A, B, C, D** or **E**; they form this basic trajectory of $\sim 5T$ -duration. In the composition of each basic trajectory, three of its five parts (steps) have the direction coinciding with that of the above trajectory. The composition of the basic trajectories **A, B, C, D** or **E** remains unchanged always.

Composition of basic trajectories (as of September 14, 1999):

A₅ —	B	C	E	D	E
B₅ —	A	D	E	C	D
C₅ —	A	C	B	D	A
D₅ —	B	E	A	B	E
E₅ —	C	E	A	C	A

The parts (steps) whose direction coincides with that of the trajectory are highlighted in white.

The parts (steps) whose direction is opposite to that of the trajectory are highlighted in black.

E. g.: Upward trajectory **B+** of **5T**-duration consists of five trajectories of **T**-duration: **A-D+E+C-D-**.

The basic trajectories are divided into straight and reversible ones. A straight trajectory is a basic trajectory, the direction of the first part (step) of which coincides with the direction of this trajectory. Reversible trajectory is a basic trajectory, the direction of the first part (step) of which is opposite to the direction of this trajectory. Basic trajectories **A, C** and **D** are straight, and basic trajectories **B** and **E** are reversible ones.

Rule of invariable groups.

The trajectories of the following five invariable groups claim to be steps in the basic trajectory composition:

- One of the trajectories **A, B** or **C** may be deemed Step 1;
- One of the trajectories **C, D** or **E** may be deemed Step 2;
- One of the trajectories **A, B** or **E** may be deemed Step 3;
- One of the trajectories **B, C** or **D** may be deemed Step 4;
- One of the trajectories **A, D** or **E** may be deemed Step 5.

Similitude rule.

It is by one trajectory only that in the list of invariable groups, each invariable group differs from a neighboring group (shifted in comparison to it by two or three positions in the list of groups) in terms of its composition.

Simulating future change dynamics in property X of process Z, using the available statistic data on changes in this property in the past.

The simulation is to be effected as follows:

1. Visual determination based on the graph corresponding to the available statistic data on possible durations of the trajectories.
... $t/25$, $t/5$, t , $5t$, $25t$...
2. Isolation of a sequence of trajectories having the same duration.
3. Visual determination of the type of each trajectory constituting a part of the sequence.
4. Correction of possible errors, correction of trajectory type names in the generated sequence. The correction shall be performed in accordance with the algorithm of the basic trajectories law, using the rule of invariable groups and the similitude rule.
5. Simulation of a trajectory sequence that continues the available trajectory sequence that is being analyzed, whose composition has been precisely determined, based on the algorithm of the basic trajectories law.

Basic trajectory graphic simulation.

The simulation shall be performed as follows:

1. Division of the basic trajectory into 5^n component steps (e.g., into 625).
The division of the basic trajectory is to be performed in accordance with the basic trajectories law.
We believe that all the resultant steps have the same absolute value of activity, equal to 1.
2. Assigning of the value +1 to each step that represents a trajectory marked with "+" designation.
Assigning of the value -1 to each step that represents a trajectory marked with "-" designation.
Creation of the sequence **P** consisting of the values +1 or -1 assigned to the trajectories' steps.
The resultant sequence **P** consists of 5^n values: $p(1)$, $p(2)$, $p(3)$... $p(5^n)$.
3. Creation of **Z**-sequence that describes the change in the value of the basic trajectory activity occurring at each of its steps.
Z-sequence consists of $(5^n) + 1$ values.
The first value of **Z**-sequence is $z(0) = 0$.
The values $z(1)$, $z(2)$, $z(3)$... $z(5^n)$ of **Z**-sequence are to be determined based on the values $p(1)$, $p(2)$, $p(3)$... $p(5^n)$ of **P**-sequence according to the following formula:

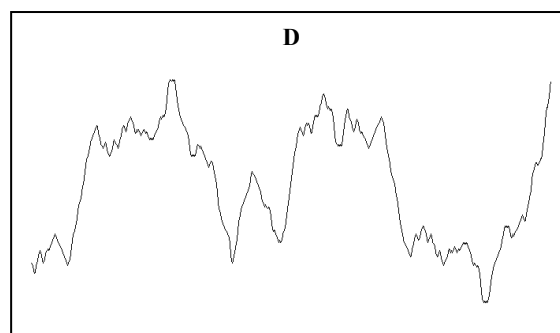
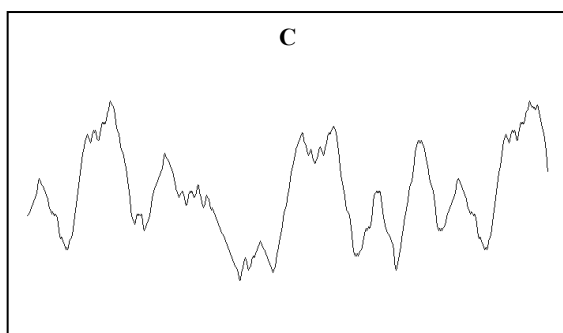
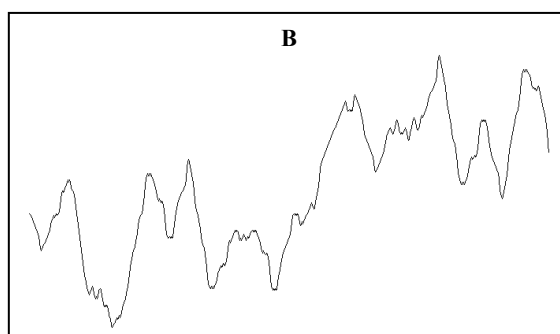
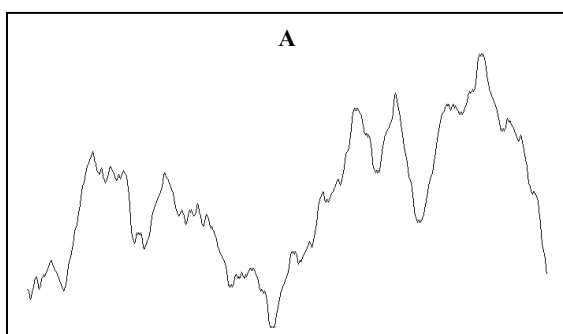
$$z(m) = z(m-1) + p(m)$$

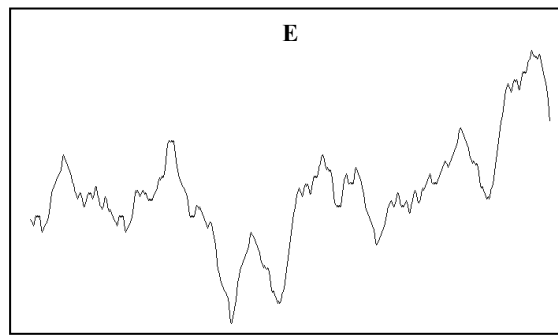
4. Building of a graph corresponding to the created **Z**-sequence.
A trend line in the "Moving Average" mode may be inserted into the graph image.
Depending of the problem we are tasked with, either the resultant graph image, or the trendline inserted into the graph image will be the sought-after picture of the basic trajectory.
The basic trajectories images created in this way may be considered **trivial**.
Note: When simulating the basic trajectories images, it has been revealed that the average values of **Z**-sequence, that is, the average values of the changes in activity of the basic trajectories, relate to each other in the following proportion:

$$zA : zB : zC : zD = 3,148 : 1 : 2,074 : 2,111 : -1,4814$$

The numbers 3,148; 1; 2,074; 2,111 and -1,4814 are called **activity (intensity) coefficients**.

Simulated trivial graphical presentation of the basic trajectories:





Analytical method based on Vassiliev's Law.

Each trading session on the financial market corresponds to a particular basic trajectory whose duration is equal to the duration of such a trading session.

The analytical method to analyze changes in the price of a financial instrument comes down to the following sequence of actions:
Determination of the type of the basic trajectory of T-duration, which describes the current price change, as well as the types of precedent trajectories.

Determination, in accordance with the existing sequence of trajectories with duration T, a type of trajectory of larger order with duration equal to $T \times 5^n$, of which the above trajectories are a part.

The composition of the discovered trajectory of a higher order describes the way of the price change in the future.

E.g.: The currency pair price-change graph reveals the sequence of two trajectories: 12-hour D- and 12-hour A-.

In accordance with the composition of the basic trajectories, the above sequence of two trajectories occurs in the only case: if D- is the last of the five steps of trajectory B+ of 60-hour duration, and A- is the first of the five steps of C-, which also has a duration of 60 hours and follows B+.

60-hour B+ and 60-hour C- correspond to the two initial steps of 300-hour A+.

B+ and C- are followed by E+, D+ and E- of 60-hour duration, that are steps 3, 4 and 5 of A+, respectively.

Thus, in this example, identifying the sequence of only two trajectories of 12-hour duration enabled us to unambiguously determine what the trajectory sequence would be like in the next 228 hours.

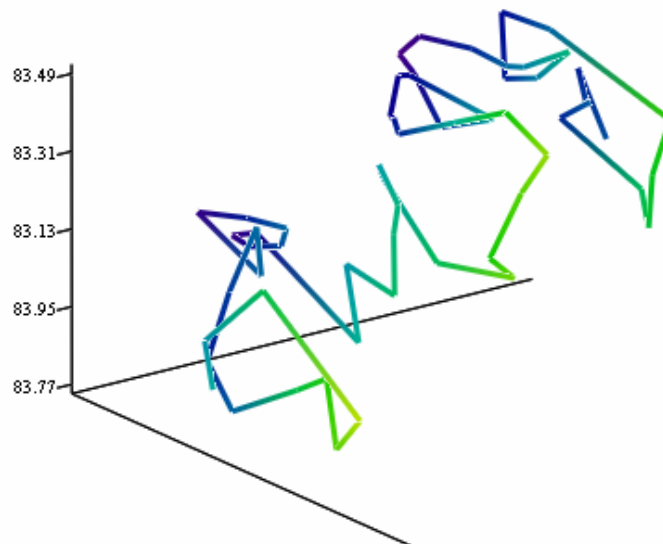
Composition of A+, divided in 5 and 25 steps:

A+																			
B+				C-				E+				D+				E-			
A-	D+	E+	C+	D-	A-	C+	B-	D+	A-	C-	E-	A+	C+	A+	B+	E-	A+	B-	E+
C+	E+	A-	C-	A-	C-	E-	A+	C+	A+	B+	E-	A+	B-	E+	C+	E+	A-	C-	A-

Properties of basic trajectories.

1. Threedimensionality of basic trajectories.

Basic trajectories are three-dimensional, and the graph of process characteristics behaviour is a projection of the sequence of three-dimensional basic trajectories. According to certain rules, a rotation of trajectories takes place, and their projections, respectively, are also subject to change. When trajectories rotate, the breaking points, described in the author's **theory of trajectory pairs**, may remain the most stable points of their projections.



2. Basic trajectory compression.

Reduction in the trading session duration is accompanied by a proportional drop in the duration of steps of the corresponding basic trajectory. The introduction of a pause in the continuous trading session may cause the occurrence of a compressed trading session before and after the pause. In this case, each of the compressed trading sessions will correspond to its specific basic trajectory.

Research study.

As a result of the research study, the author has succeeded to determine the basic trajectories to which the 1999 dynamics of changes in Gazprom shares' prices corresponds.

Date:	Status:	Type:
11 March, 1999	4D+	B-
15 April, 1999	5D+	E+
25 May, 1999	1A+	B+
30 June, 1999	2A+	C-
3 August, 1999	3A+	E+
8 September, 1999	4A+	D+
13 October, 1999	5A+	E-

* Trajectory duration: ~200 hours.

The same has been determined for the dynamics of USD/JPY(FOREX) price changes.

Date:	Status:	Type:
23 December, 1998	4D-	B+
19 March, 1999	5D-	E-
16 June, 1999	1C+	A+
10 September, 1999	2C+	C-
8 December, 1999	3C+	B+

* Trajectory duration: 1,500 hours.

The additional analysis of the pair of USD/JPY, covering the period from 1981, enabled us to determine the type of a trajectory of a higher order, which includes the specified trajectories of 1,500-hour duration for the year 1999.

As a result, the author has identified the exact composition of the basic trajectories for the pair of USD/JPY (FOREX) until year 2053.

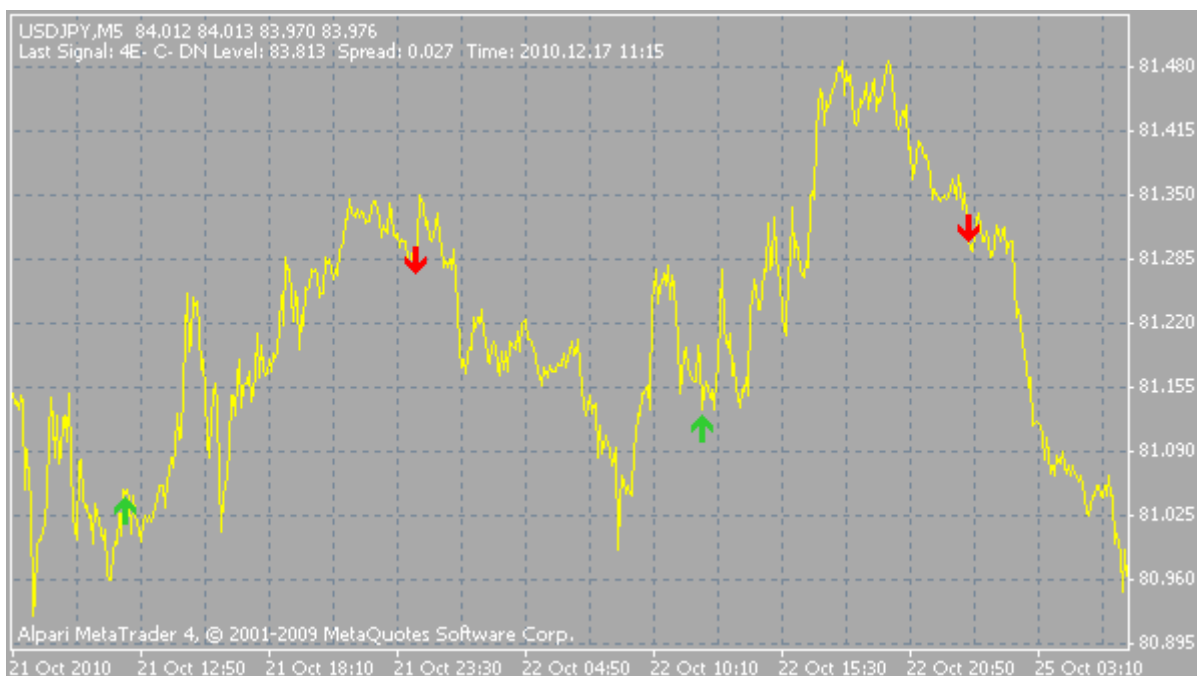
Date:	Status:	Type:
26 June, 1981	4E+	C+
24 June, 1987	5E+	A+
18 June, 1993	1D+	B+
16 June, 1999	2D+	E-
10 June, 2005	3D+	A+
8 June, 2011	4D+	B-
2 June, 2017	5D+	E+
31 May, 2023	1E-	C+
25 May, 2029	2E-	E+
23 May, 2035	3E-	A-
17 May, 2041	4E-	C-
15 May, 2047	5E-	A-
9 May, 2053		

* Trajectory duration: 37,500 hours.

** The dates of the trajectories' beginning were estimated based on the days-off only: Saturday and Sunday, without taking into account calendar shifts on the occasion of Christmas, New-Year and other holidays, and also without regard for possible trading session cutbacks (compressions) because of the holidays .

Indicator on the basis of the Vassiliev's Law for the pair of USD/JPY (FOREX).

Based on the research data, for the MetaTrader Trading Platform, the author devised an indicator that describes the behaviour scenario (fate) for the currency pair of USD/JPY (FOREX) until year 2053. The indicator provides distribution of the known future composition of the basic trajectories for the pair of USD/JPY on weekdays and displays the signal to buy or sell at the beginning of the trajectory of the pre-set duration. The signal to buy corresponds to the upward trajectories. The signal to sell corresponds to the downward trajectories. To secure correct distribution across the calendar, all the holidays and the shift in trading sessions, arising in connection with the above, shall be taken into consideration. The indicator has a parameter of **TimeShift** to store the value of the calendar shift, associated with New Year and other holidays. The **TimeShift** value differs from year to year. A number of 12-hour trading sessions is the measuring unit of such a shift. The value of the shift varies year after year, and usually remains constant throughout the year. A shift variation may be both positive or negative, because of the trading session cutbacks. The said shift is added by the indicator to a certain date, being a starting point for the estimation of the basic trajectory future composition.



Results statistics of the trading strategy based on Vassiliev's Law.

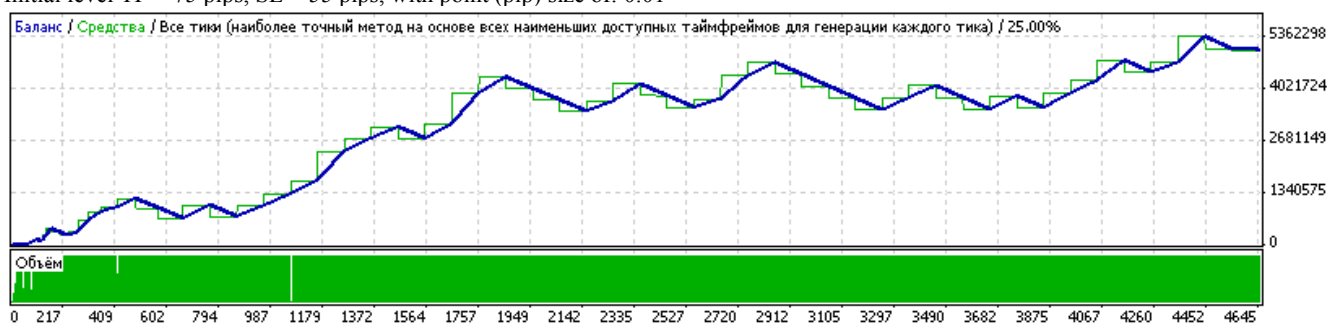
Initial deposit: \$1,000.00

Leverage: 1:500

Trading interval: 01/12/2008 – 01/12/2009

Instrument: USD/JPY, period: 1 Minute (M1)

Initial level TP = 75 pips, SL = 55 pips, with point (pip) size of: 0.01



Initial deposit: \$1,000.00

Leverage: 1:500

Trading interval: 01/12/2009 – 01/12/2010

Instrument: USD/JPY, period: 1 Minute (M1)

Initial level TP = 75 pips, SL = 55 pips, with point (pip) size of: 0.01



Expert advisor (trading robot), whose strategic statistic result data were presented, exercises the simplest and risky approach; it does not implement any complex simulation of the future price value, nor use all the information about the exact form of the future basic trajectory. It just opens a position at the beginning of the basic trajectories of a certain duration, based on their nominal direction. Opening a long position corresponds to the upward trajectories. Opening a short position corresponds to the downward trajectories. Based on the results of testing that was carried out with the expert advisor using 2-year historical data, one could have increased the deposit, with the reinvestment taken into account, ~ 3,000,000-fold or by ~ 300,000,000%.

The author of the Law invites everyone to use the expert advisor and the custom indicator created by him for the MetaTrader Trading Platform and to jointly determine their optimal parameters and the calendar shift for the year to come.

The ready-to-use expert advisor and custom indicator, created on the basis of Vassiliev's Law, you can download from site: www.vassiliev.ru or www.moneyjinn.com