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Analytics

Technical indicators and line studies are built into the terminal for analytical purposes. These objects are imposed directly into the chart and allow to forecast further price changes. At that, indicators are imposed automatically, and line studies are attached manually. This is why, when working with line studies, one has to draw them properly. Parameters of indicators can be set up manually, as well. Technical indicators can have different settings for different symbols or periods.

The use of technical indicators and line studies allows to open and close reasonable trade positions, place and modify pending orders. Moreover, using of analytical means allows to perform systematic trading activities and reduces in that way the influence of human emotions. Along with technical indicators, custom indicators written in MetaQuotes Language 4 (MQL 4) can be used for analytical purposes. No line studies or similar tools can be written in MQL 4.

Graphical Objects

Graphical objects are objects in the terminal that are imposed manually into the chart. These objects are used for analytical purposes. They include:

- **Line Studies** — lines and various geometrical shapes to be imposed into the price or indicators charts. They include support/resistance lines, trendlines, as well as Fibonacci, Gann, Andrews' tools, etc. More details about line studies can be found in the section of the same name;
- **Shapes** — geometrical shapes (rectangle, triangle, and ellipse) that allow to mark various areas in the price chart;
- **Arrows** — arrows and signs that allow to mark the most significant points in the chart;
- **Text** — text intended for adding of comments to the chart;
- **Text Label** — text intended for adding of comments and anchored to the chart window coordinates. Text label does not move when the chart is scrolled.

All objects are grouped in the "Insert" menu and in the "Line Studies" toolbar. Having selected an object in the list and set a point in the chart (or in an indicator window), one can impose the tool.

Attention: To impose several objects, one has to set more than one point. The object will not appear in the chart until all necessary points are set.

After the object has been created, it can be moved or modified. To do so, one has to select the object first. If the "Select object by single mouse click" parameter is set in terminal settings, one has to click once with the left mouse button on any element of the object. If not, the double-click should be used. The object can be considered as selected if square markers or frames appear. The markers are intended for moving of objects and changing their drawing parameters. Thus, for example, to change the Fibonacci Fan location, one has to hold its central marker with the left mouse button and move the cursor. And moving of any of the extreme markers will result in changing of the object drawing parameters. Terminal allows to create copies of various object very fast. To do so, one has to select the object and, holding Ctrl pressed, move it with the central marker.

All objects imposed into the chart become unnecessary sooner or later, and they can be removed by commands of the context menu. Besides, the Backspace key allows to remove objects in series. In future, all removed objects can be restored. To do so, it is necessary to execute the "Undo Delete" command of the object context menu, the "Charts — Objects — Undo Delete" menu command, or use accelerating keys of Ctrl+Z.

Object Properties

Every object has its specific properties. Properties can differ depending on the object. To manage the properties of an object, one has to select the object and execute its context menu command of "Properties...", the "Charts — Objects — Objects List" menu command. After that, the window of the object name will appear that contains several tabs. General object settings are placed in the "Common" tab. The following is available here:

- **Name** — the object unique name within one chart that is set for the object automatically. It can be changed if another name is entered in this field. Such names make it easy to mark the object out among many others of the same type;
- **Description** — description/text contents of the object that also serve for marking it out among many others of the same type. Besides, these descriptions can be shown in the chart if the "Show object descriptions" option is enabled in the chart settings;
- **Style** — object lines style. Color, forms and thickness of lines can be chosen here;
- **Draw object as background** — draw object in the background, behind the chart. Being enabled, this option provides filling of the objects like shapes or channels (excluding Fibonacci Channel) with color.

Coordinates of the object control points in the chart can be changed in the "Parameters" tab. Time coordinates of the object control points should be entered in the "Time" fields, and coordinates of anchoring to vertical axis of a chart of indicator should be given in the "Value" fields. An object can have from one to three coordinates. For some objects, additional options are used in the "Parameters" tab:














- **Angle in degrees** — angle of the object slope anticlockwise in degrees;
- **Scale** — ratio between units of vertical (pips) and horizontal (bars) axes of the object. Normally, the number of pixels in a unit of the horizontal axis (time) differs from that of the vertical axis (prices) when chart are drawn. One-to-one scale brings them to the same value. For certain objects, changing of this parameter changes the ratio;
- **Arrow code** — object code;
- **Ray** — show the object trendlines as rays;
- **Anchor** — one of the chart corners at which the text label is anchored;
- **X-distance:** — horizontal distance between the anchor corner of the window and the text label in pixels;
- **Y-distance:** — vertical distance between the anchor corner of the window and the text label in pixels.






The object visualization mode for different timeframes can be changed in the "Visualization" tab. The object will then be shown only for the selected timeframes. This can be useful when the tool has different settings for different timeframes. The "Fibo Levels" tab is specifically used only for Fibonacci tools. The list of the tool levels is given here in form of a table. The values of the levels can be changed or deleted (the "Delete" button). A new level can be added by pressing of the "Add" button. At that, if "(%\$)" is entered in the "Description" field, the price value corresponding with this level will be shown in the chart. The "Defaults" button resets the initial values. The "Style" field that allows to set up the color, appearance, and thickness of levels of the object is located in the lower part of the tab.

Line Studies

Line studies are lines and various geometrical shapes that can be imposed into a price or indicator chart. They include support/resistance lines, trend lines, as well as Fibonacci's, Gann's, and Andrews' tools, etc.


Line studies are collected in the "Insert" menu and in the "Line Studies" toolbar in terminal. To impose an object, one has to press the corresponding toolbar button (the buttons are given in the leftmost column of the table) or execute a menu command.

	Menu Command	Description
	Horizontal Line	Horizontal line can be used to mark various levels, particularly, those of support/resistance. One point must be set for this object to be imposed.
	Vertical Line	Vertical line can be used to mark various borders in the time axis and to compare signals of indicators to price changes. One point must be set for this object to be imposed.
	Trendline	Trendline helps to explore trends in price changes. Two points must be set through which a trendline will be drawn.
	Trendline by Angle	Trendline by angle helps to explore trends in price changes. Unlike for a simple trendline, an angle must be set for this line to be drawn. Two points must be set through which a trendline will be drawn.
	Linear Regression Channel	Linear regression is a statistical analysis tool used for forecasting of future values on basis of available data. If the trend is ascending, one can logically suppose that the next bar will be a bit higher than the preceding one. The linear regression method allows to have a statistical demonstration of such logical conclusions. Two points must be set for this tool to be drawn.
	Equidistant Channel	Lines of the equidistant channel are always parallel. Two points must be set for this tool to be drawn.
	Standard Deviation Channel	Standard deviation is the way of volatility measuring based on statistical methods. Standard deviation influences the width of this channel. Two points must be set for this tool to be drawn.
	Gann Line	Gann Line represents a trendline drawn at an angle of 45 degrees. Two points must be set for this tool to be drawn.
	Gann Fan	Gann Fan represents a set of trendlines drawn from one point at different angles. Gann considered the trendline of 1x1 (45 degrees) for a very important one. If the price curve is above this line, the market should be considered as bull market, if it is below, it is bear market. Gann supposed the ray of 1x1 to be a powerful supporting line at an ascending trend, and breaking of this line — to be an important turn signal. One point must be set for Gann Fan to be drawn.
	Gann Grid	Lines of the Gann Grid are drawn at an angle of 45 degrees. Two points must be set for this tool to be drawn.
	Fibonacci Retracement	Leonardo Fibonacci is considered to have discovered a number sequence where each successive number represents a sum of two preceding ones: 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, 89, 144, etc. Each number is approximately 1.618 times more than the preceding one, and each number makes approximately 0.618 of the successive one. The tool can be drawn on two points that determine the trendline. At that, horizontal lines that meet the trendline at Fibonacci levels (retracement) as 0.0%, 23.6%, 38.2%, 50%, 61.8%, 100%, 161.8%, 261.8%, and 423.6% are drawn automatically.
	Fibonacci Channel	To draw this tool, a channel is used the width of which is taken as one. Then, at the distances defined by the Fibonacci sequence, parallels are drawn starting with the distance of 0.618 of the channel width, then 1.000, 1.618, 2.618, 4.236, etc. Two points and the basic channel width must be set for this tool to be drawn.
	Fibonacci Time Zones	Fibonacci Time Zones represent a row of vertical lines placed at Fibonacci intervals from each other: 1, 2, 3, 5, 8, 13, 21, 34, etc. It is considered that significant price changes should

		be expected near these lines. The tool can be drawn on two points that define the unit interval.
	Fibonacci Fan	Fibonacci Fan is drawn on two points that define the trendline. Then an «invisible» vertical line is drawn through the second point. Then three trendlines are drawn from the first point, these trendlines meeting the invisible vertical line at Fibonacci levels of 38.2%, 50%, and 61.8%. It is considered that significant price changes should be expected near these lines.
	Fibonacci Arcs	The tool named Fibonacci Arcs is drawn on two points that define the trendline. Then three arcs having the centers in the second point are drawn, these arcs meeting the trendline at Fibonacci levels of 38.2%, 50%, and 61.8%. It is considered that significant price changes should be expected near these arcs.
	Fibonacci Expansion	Fibonacci Expansion is drawn on three points that circumscribe two waves. Then three lines meeting the third, "presumptive", wave at Fibonacci levels of 61.8%, 100%, and 161.8%, are drawn. It is considered that significant price changes should be expected near these lines.
	Andrews' Pitchfork	This tool is drawn on three points and represents the parallel trendlines. The first trendline starts at the selected leftmost point (it is an important peak or trough) and is drawn precisely between two rightmost points. This line is the pitchfork «helve». Then, the second and the third trendlines outgoing from the above-mentioned rightmost points (significant peak and trough) are drawn in parallel to the first trendline. These lines are the pitchfork «teeth». Andrews' Pitchfork is interpreted as support/resistance lines are normally interpreted.
	Cycle Lines	This tool represents a row of vertical lines placed at equal intervals. Normally, a unit interval corresponds with one cycle. At that, completed lines are considered to describe future cycles. The tool is drawn on two points that define the unit interval

Technical Indicators

Technical indicator is a mathematical manipulation of a security price and/or volumes aimed at forecasting of future price changes. Decisions about how and when to open or close positions can be made on basis of signals from technical indicators. According to their functionalities, indicators can be divided into two groups: trend indicators and oscillators. Trend indicators help to assess the price direction and detect the turn moments synchronously or with a delay. Oscillators allow to find the turning moments ahead or synchronously.

Indicators are imposed into the chart from the "Navigator" window by means of Drag`n` Drop technique, by execution of the "Insert — Indicators" menu command, or by pressing of the  button of the "Charts" toolbar. A technical indicator can be drawn in a separate indicator window that has a specific vertical scale (for example, MACD) or it can be imposed directly into the price chart (for example, Moving Average). At that, indicators can be drawn not only for price data and derivatives thereof (Median Price, Typical Price, Weighted Close), but also for other indicators. For example, Moving Average for Awesome Oscillator can be drawn, and a signal line can be obtained additionally to AO in this way. To do so, one has to draw AO indicator first, and then, using Drag`n` Drop technique, impose MA into AO and select "Previous Indicator Data" option in its settings in the "Apply to" option. If the "First Indicator Data" option is selected, MA will be drawn on basis of data of the very first imposed indicator that can be other than AO.

Besides analytical parameters, one can set colors for various elements, thickness of lines, and sizes of signs used, at setting up of the indicator. Moreover, the visualization mode of the object for different timeframes can be changed in the "Visualization" tab. At that, indicator will be shown on at timeframes that have been selected. This function can be useful if the tool has different settings for different timeframes. Using the "Show in the Data Window" option in the same tab, one can control over visualization of information about indicators in the "Data Window".

All settings can be changed. To do so, one has to select the desired indicator in the "Indicators List" window and press the "Edit" button or execute the "Properties..." command of the indicator context menu. Indicator context menu can be called by clicking with the right mouse button on a line, sign, or diagram of the desired indicator. To remove an indicator, one has to execute the "Delete Indicator" indicator context menu command or the "Delete Indicator Window" command in the chart or indicator context menus. The "Delete Indicator Window" command closes the indicator window.

Attention: Having placed cursor near a line, a sign, or a column border of an indicator histogram, one can determine precise value of this given indicator in this point.

There is a large amount of developed technical indicators in the world, some of them are represented in **MetaTrader STS Finance:**

- Accumulation/Distribution;
- ADX;
- Average True Range;
- Bollinger Bands;
- Commodity Channel Index;
- DeMarker;
- Elder-rays;
- Envelopes;
- Force Index;
- Ichimoku Kinko Hyo;
- MACD;
- Market Facilitation Index;
- Momentum;
- Money Flow Index;
- Moving Average;
- Moving Average of Oscillator;
- On Balance Volume;
- Parabolic SAR.
- Relative Strength Index;
- Relative Vigor Index;
- Stochastic Oscillator;
- Williams' Percent Range;
- Williams' Alligator;
- Awesome Oscillator;
- Accelerator/Decelerator Oscillator;
- Fractals.

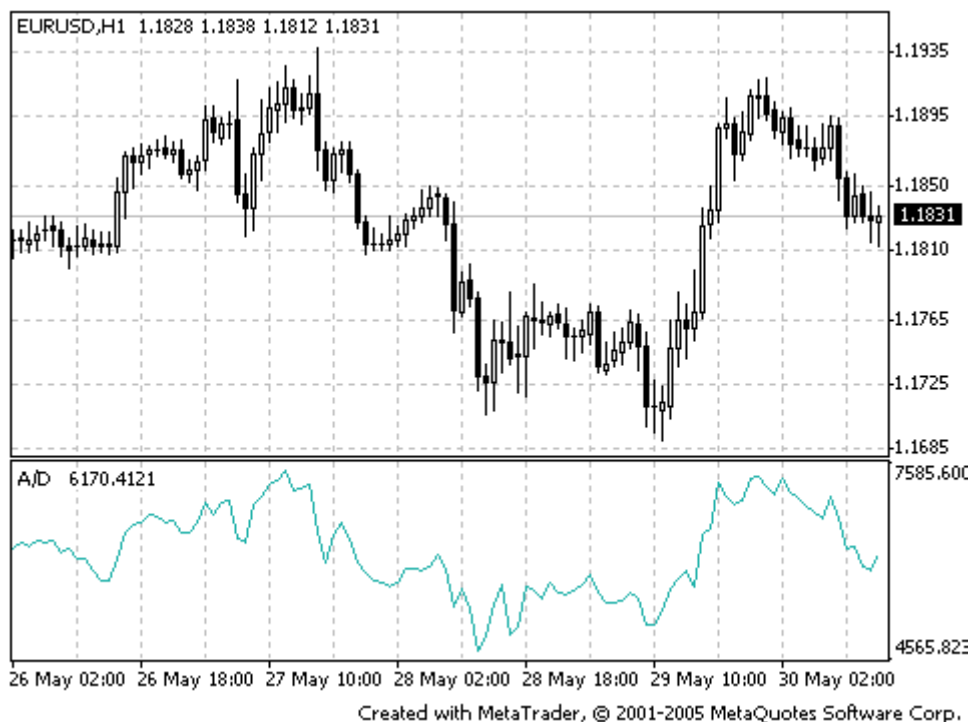
Accumulation/Distribution (A/D)

Accumulation/Distribution Technical Indicator is determined by the changes in price and volume. The volume acts as a weighting coefficient at the change of price — the higher the coefficient (the volume) is, the greater the contribution of the price change (for this period of time) will be in the value of the indicator.

In fact, this indicator is a variant of the more commonly used indicator On Balance Volume. They are both used to confirm price changes by means of measuring the respective volume of sales.

When the Accumulation/Distribution indicator grows, it means accumulation (buying) of a particular security, as the overwhelming share of the sales volume is related to an upward trend of prices. When the indicator drops, it means distribution (selling) of the security, as most of sales take place during the downward price movement.

Divergences between the Accumulation/Distribution indicator and the price of the security indicate the upcoming change of prices. As a rule, in case of such divergences, the price tendency moves in the direction in which the indicator moves. Thus, if the indicator is growing, and the price of the security is dropping, a turnaround of price should be expected.



Calculation:

A certain share of the daily volume is added to or subtracted from the current accumulated value of the indicator. The nearer the closing price to the maximum price of the day is, the higher the added share will be. The nearer the closing price to the minimum price of the day is, the greater the subtracted share will be. If the closing price is exactly in between the maximum and minimum of the day, the indicator value remains unchanged.

$$A/D = \text{SUM}[\frac{((\text{CLOSE} - \text{MINIMUM}) - (\text{MAXIMUM} - \text{CLOSE})) * \text{VOLUME}}{(\text{MAXIMUM} - \text{MINIMUM})}, N]$$

Where:

N — the quantity of periods used in the calculation

ADX (Average Directional Movement Index)

Average Directional Movement Index Technical Indicator (ADX) helps to determine if there is a price trend. It was developed and described in detail by Welles Wilder in his book "New concepts in technical trading systems".

The simplest trading method based on the system of directional movement implies comparison of two direction indicators: the 14-period +DI one and the 14-period -DI. To do this, one either puts the charts of indicators one on top of the other, or +DI is subtracted from -DI. W. Wilder recommends buying when +DI is higher than -DI, and selling when +DI sinks lower than -DI.

To these simple commercial rules Wells Wilder added "a rule of points of extremum". It is used to eliminate false signals and decrease the number of deals. According to the principle of points of extremum, the "point of extremum" is the point when +DI and -DI cross each other. If +DI raises higher than -DI, this point will be the maximum price of the day when they cross. If +DI is lower than -DI, this point will be the minimum price of the day they cross.

The point of extremum is used then as the market entry level. Thus, after the signal to buy (+DI is higher than -DI) one must wait till the price has exceeded the point of extremum, and only then buy. However, if the price fails to exceed the level of the point of extremum, one should retain the short position.



Calculation

$$ADX = \frac{\text{SUM}[(+DI - (-DI)) / (+DI + (-DI)), N]}{N}$$

Where:

N — the number of periods used in the calculation

Average True Range (ATR)

Average True Range (ATR) is the indicator of volatility of the market. It was introduced by Wells Wilder in his book *New Concepts of Technical Trading Systems*, and since then the indicator is applied as a constituent of many other indicators and trading systems.

ATR often reaches high values in the market foundations after sheer fall in prices caused with panic selling. Low values of the indicator often correspond with long periods of horizontal movement being observed in the market summits and during the consolidation time. It can be interpreted by the same rules as other volatility indicators. The principle of prediction with the help of this indicator is formulated as follows: the higher the value of the indicator is, the more probable the trend change is; the lower this value is, the weaker the trend orientation is.



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Calculation

True Range is the greatest of the following three values:

- difference between the current maximum and minimum (high and low);
- difference between the previous closing price and the current maximum;
- difference between the previous closing price and the current minimum.

The indicator of Average True Range is a moving average of values of the true range.

Bollinger Bands

Bollinger Bands are similar to moving average envelopes. The difference between them consists in that the margins of envelopes are positioned above and below the moving average curve at the fixed distance expressed as percentage, whereas the margins of Bollinger Bands are based on distances equal to a certain amount of standard deviations. Inasmuch as the value of the standard deviation depends on volatility, the bands regulate their own width: it increases when the market is unstable, and decreases during more stable periods.

Bollinger Bands are usually plotted in the price chart, but they can also be plotted in the indicator chart.

All mentioned below concerns the bands plotted in price charts. Like in the case of envelope moving averages, the Bollinger Bands interpretation is based on that it is inherent to the prices to stay in the range of highest and lowest margins of the band. A distinctive feature of Bollinger Bands is their variable width determined with the volatility of prices. In the periods of significant price changes (i.e., of high volatility), the bands become wider giving space to prices. In the economic glut periods (i.e., of low volatility) the bands become narrow keeping the prices in the range of their margins.

Bollinger Bands features:

- Price leaps usually happen after band narrowing corresponding with the volatility decrease.
- If prices exceed the range of the band the continuation of the current tendency should be predicted.
- If the peaks and troughs outside the band are followed by peaks and troughs inside of the band, the turn of the tendency is possible.
- Price movement having started from one of the band margins usually reaches the opposite margin. The latter observation is useful for predicting price guideposts.



Calculation:

Bollinger bands are formed by three lines. The middle line (ML) is a usual Moving Average.

$$ML = \text{SUM} [\text{CLOSE}, N] / N$$

The top line, TL, is the same as the middle line a certain number of standard deviations (D) higher than the ML.

$$TL = ML + (D * \text{StdDev})$$

The bottom line (BL) is the middle line shifted down by the same number of standard deviations.

$$BL = ML - (D * \text{StdDev})$$

Where:

N — is the number of periods used in calculation;

SMA — Simple Moving Average;

StdDev — means Standard Deviation.

$$\text{StdDev} = \text{SQRT}(\text{SUM}[(\text{CLOSE} - \text{SMA}(\text{CLOSE}, N))^2, N]/N)$$

It is recommended to use 20-period Simple Moving Average as the middle line, and plot top and bottom lines two standard deviations away from it. Besides, moving averages of less than 10 periods are of little effect.

Commodity Channel Index (CCI)

Commodity Channel Index (CCI) measures the deviation of the commodity price from its average statistical price. High values of the index point out that the price is unusually high being compared with the average one, and low values show that the price is too low. In spite of its name, the CCI can be applied for any financial instrument, and not only for the wares.

There are two basic techniques of using CCI:

- For finding the divergences
The divergence appears when the price reaches a new maximum, and CCI can not grow above the previous maximums. This classical divergence is normally followed by the price correction.
- As an indicator of overbuying/overselling
CCI usually varies in the range of ± 100 . Values above +100 inform about overbuying state (and about a probability of correcting decay), and the values below 100 inform about the overselling state (and about a probability of correcting increase).



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Calculation:

1. To find a Typical Price. You need to add the HIGH, the LOW, and the CLOSE prices of each bar and then divide the result by 3.

$$\text{TP} = (\text{HIGH} + \text{LOW} + \text{CLOSE})/3$$

2. To calculate the n-period Simple Moving Average of typical prices.

$$\text{SMA}(\text{TP}, N) = \text{SUM}[\text{TP}, N]/N$$

3. To subtract the received SMA(TP, N) from Typical Prices.

$$D = TP - SMA(TP, N)$$

4. To calculate the n-period Simple Moving Average of absolute D values.

$$SMA(D, N) = \text{SUM}[D, N]/N$$

5. To multiply the received SMA(D, N) by 0,015.

$$M = SMA(D, N) * 0,015$$

6. To divide M by D

$$CCI = M/D$$

Where:

SMA — Simple Moving Average;

N — number of periods, used for calculation

DeMarker

Demarker Technical Indicator is based on the comparison of the period maximum with the previous period maximum. If the current period (bar) maximum is higher, the respective difference between the two will be registered. If the current maximum is lower or equaling the maximum of the previous period, the naught value will be registered. The differences received for N periods are then summarized. The received value is used as the numerator of the DeMarker and will be divided by the same value plus the sum of differences between the price minima of the previous and the current periods (bars). If the current price minimum is greater than that of the previous bar, the naught value will be registered.

When the indicator falls below 30, the bullish price reversal should be expected. When the indicator rises above 70, the bearish price reversal should be expected.

If you use periods of longer duration, when calculating the indicator, you'll be able to catch the long term market tendency. Indicators based on short periods let you enter the market at the point of the least risk and plan the time of transaction so that it falls in with the major trend.



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Calculation:

The value of the DeMarker for the "i" interval is calculated as follows:

- The DeMax(i) is calculated:
If $\text{high}(i) > \text{high}(i-1)$, then $\text{DeMax}(i) = \text{high}(i) - \text{high}(i-1)$, otherwise $\text{DeMax}(i) = 0$
- The DeMin(i) is calculated:
If $\text{low}(i) < \text{low}(i-1)$, then $\text{DeMin}(i) = \text{low}(i-1) - \text{low}(i)$, otherwise $\text{DeMin}(i) = 0$
- The value of the DeMarker is calculated as:
 $\text{DMark}(i) = \text{SMA}(\text{DeMax}, N) / (\text{SMA}(\text{DeMax}, N) + \text{SMA}(\text{DeMin}, N))$

Where:

SMA — Simple Moving Average;

N — the number of periods used in the calculation

Elder-rays

The Elder-rays combine the properties of trend following indicators and oscillators. They use exponential moving average indicator (**EMA**, the best period is 13) as a tracing indicator. The oscillators reflect the power of bulls and bears. To plot the Elder-rays three charts should be used: on one side, the price chart and EMA will be plotted, on two other sides bulls power oscillator (**Bulls Power**) and bears power oscillator (**Bears Power**) will be plotted.

Elder-rays are used both individually and together with other methods. If using them individually, one should take into account that the EMA slope determines the trend movement, and position should be opened in its direction. Bulls and bears power oscillators are applied for defining the moment of positions opening/closing. The following positions should be opened:

- Buy, if:
 1. there is an increasing trend (determined with the EMA movement).
 2. the Bears Power oscillator is negative, but increasing at the same time.
 3. the last peak of the Bulls Power oscillator is higher than the previous one.
 4. the Bears Power oscillator increases after the Bulls divergence.At the positive values of the Bears Power oscillator, it is better to keep back.
- Sell, if:
 1. there is a decreasing trend (determined with the EMA movement).
 2. the Bulls Power oscillator is positive, but decreases gradually.
 3. the last trough of the Bulls Power oscillator is lower than the previous one.
 4. the Bulls Power oscillator decreases leaving the Bears' divergence.

Do not open short positions when the Bulls Power oscillator is negative.

Divergence between the Bulls and Bears Power and prices is the best time for trading.



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Calculation:

BULLS = HIGH - EMA
BEARS = LOW - EMA

Where:

BULLS — Bull Power;

BEARS — Bear Power;

HIGH — the highest price of the current bar;

LOW — the lowest price of the current bar;

EMA — exponential moving average.

Envelopes

The Envelopes are formed with two moving averages one of which is shifted upward and another one is shifted downward. The selection of optimum relative number of band margins shifting is determined with the market volatility: the higher the latter is, the stronger the shift is. Envelopes define the upper and the lower margins of the price range.

- Signal to sell appears when the price reaches the upper margin of the band;
- Signal to buy appears when the price reaches the lower margin.

Envelopes Technical Indicator is formed with two Moving Averages one of which is shifted upward and another one is shifted downward. The selection of optimum relative number of band margins shifting is determined with the market volatility: the higher the latter is, the stronger the shift is.

Envelopes define the upper and the lower margins of the price range. Signal to sell appears when the price reaches the upper margin of the band; signal to buy appears when the price reaches the lower margin.

The logic behind envelopes is that overzealous buyers and sellers push the price to the extremes (i.e., the upper and lower bands), at which point the prices often stabilize by moving to more realistic levels. This is similar to the interpretation of Bollinger Bands.



Calculation

$$\begin{aligned}\text{Upper Band} &= \text{SMA}(\text{CLOSE}, N) * [1 + K/1000] \\ \text{Lower Band} &= \text{SMA}(\text{CLOSE}, N) * [1 - K/1000]\end{aligned}$$

Where:

SMA — Simple Moving Average;

N — averaging period;

K/1000 — the value of shifting from the average (measured in basis points)

Force Index

The Force Index was developed by Alexander Elder. This index measures the Bulls Power at each increase, and the Bulls Power at each decrease. It connects the basic elements of market information: price trend, its drops, and volumes of transactions. This index can be used as it is, but it is better to approximate it with the help of moving average. Approximation with the help a short moving average (the author proposes to use 2 intervals) contributes to finding the best opportunity to open and close positions. If the approximations is made with long moving average (period 13), the index shows the tendencies and their changes.

- It is better to buy when the forces become minus (fall below zero) in the period of indicator increasing tendency;
- The force index signalizes the continuation of the increasing tendency when it increases to the new peak;
- The signal to sell comes when the index becomes positive during the decreasing tendency;
- The force index signalizes the Bears Power and continuation of the decreasing tendency when the index falls to the new trough.
- If price changes do not correlate to the corresponding changes in volume, the force indicator stays on one level, which tells you the trend is going to change soon.



Calculation

The force of every market movement is characterized by its direction, scale and volume. If the closing price of the current bar is higher than the preceding bar, the force is positive. If the current closing price is lower than the preceding one, the force is negative. The greater the difference in prices is, the greater the force is. The greater the transaction volume is, the greater the force is.

$$\text{RAW FORCE INDEX} = \text{VOLUME}(i) * (\text{CLOSE}(i) - \text{CLOSE}(i-1))$$
$$\text{FORCE INDEX} = \text{MA}(\text{RAW FORCE INDEX}, N)$$

Where:

MA — any Moving Average (Simple, Exponential, Seighted and Smoothed);

N — the smoothing period;

CLOSE(i) — the closing price of the current bar;

CLOSE(i-1) — the closing price of the preceding bar

Ichimoku Kinko Hyo

Ichimoku Kinko Hyo is predefined to characterize the market trend, support and opposition levels, and to generate signals of buying and selling. This indicator works best at week and day charts.

When defining the dimension of parameters, four time intervals of different length are used. The values of individual lines composing this indicator are based on these intervals:

- Tenkan-sen shows the average price value during the first time interval defined as the sum of maximum and minimum within this time, divide by two.
- Kijun-sen shows the average price value during the second time interval.
- Senkou Span A shows the middle of the distance between two previous lines shifted forwards by the value of the second time interval.
- Senkou Span B shows the average price value during the third time interval shifted forwards by the value of the second time interval.

Chinkou Span shows the closing price of the current candle shifted backwards by the value of the second time interval. The distance between the Senkou lines is hatched with another color and called "cloud". If

the price is between these lines, the market should be considered as non-trend, and then the cloud margins form the support and resistance levels.

- If the price is above the cloud, its upper line forms the first support level, and the second line forms the second support level;
- If the price is below cloud, the lower line forms the first resistance level, and the upper one forms the second level;
- If the Chinkou Span line traverses the price chart in the bottom-up direction it is signal to buy. If the Chinkou Span line traverses the price chart in the top-down direction it is signal to sell.

Kijun-sen is used as an indicator of the market movement. If the price is higher than this indicator, the prices will probably continue to increase. When the price traverses this line the further trend changing is possible. Another kind of using the Kijun-sen is giving signals. Signal to buy is generated when the Tenkan-sen line traverses the Kijun-sen in the bottom-up direction. Top-down direction is the signal to sell. Tenkan-sen is used as an indicator of the market trend. If this line increases or decreases, the trend exists. When it goes horizontally, it means that the market has come into the channel.



Moving Average Convergence/Divergence (MACD)

Moving Average Convergence/Divergence (MACD) is the dynamic indicator following the tendency. It shows the ratio between two moving averages of the price.

The MACD is developed as the difference between two exponential moving averages (EMA) having periods of 12 and 26 days. To define the best opportunities for buying or selling clearly, the so called signal line will be plotted in the MACD chart: it is the 9-days-moving-average of the indicator.

MACD is the most effective under conditions when the market swings with high amplitude in trading. The most frequently used signals of MACD are intersections, overbuying/overselling states and divergences.

Crossovers

The basic MACD trading rule is to sell when the MACD falls below its signal line. Similarly, a buy signal occurs when the Moving Average Convergence/Divergence rises above its signal line. It is also popular to buy/sell when the MACD goes above/below zero.

Overbought/oversold conditions

The MACD is also useful as an overbought/oversold indicator. When the shorter moving average pulls away dramatically from the longer moving average (i.e., the MACD rises), it is likely that the security price is overextending and will soon return to more realistic levels.

Divergence

An indication that an end to the current trend may be near occurs when the MACD diverges from the security. A bullish divergence occurs when the Moving Average Convergence/Divergence indicator is making new highs while prices fail to reach new highs. A bearish divergence occurs when the MACD is making new lows while prices fail to reach new lows. Both of these divergences are most significant when they occur at relatively overbought/oversold levels.



Calculation of MACD

The MACD is calculated by subtracting the value of a 26-period exponential moving average from a 12-period exponential moving average. A 9-period dotted simple moving average of the MACD (the signal line) is then plotted on top of the MACD.

$$\text{MACD} = \text{EMA}(\text{CLOSE}, 12) - \text{EMA}(\text{CLOSE}, 26)$$
$$\text{SIGNAL} = \text{SMA}(\text{MACD}, 9)$$

Where:

EMA — the Exponential Moving Average;

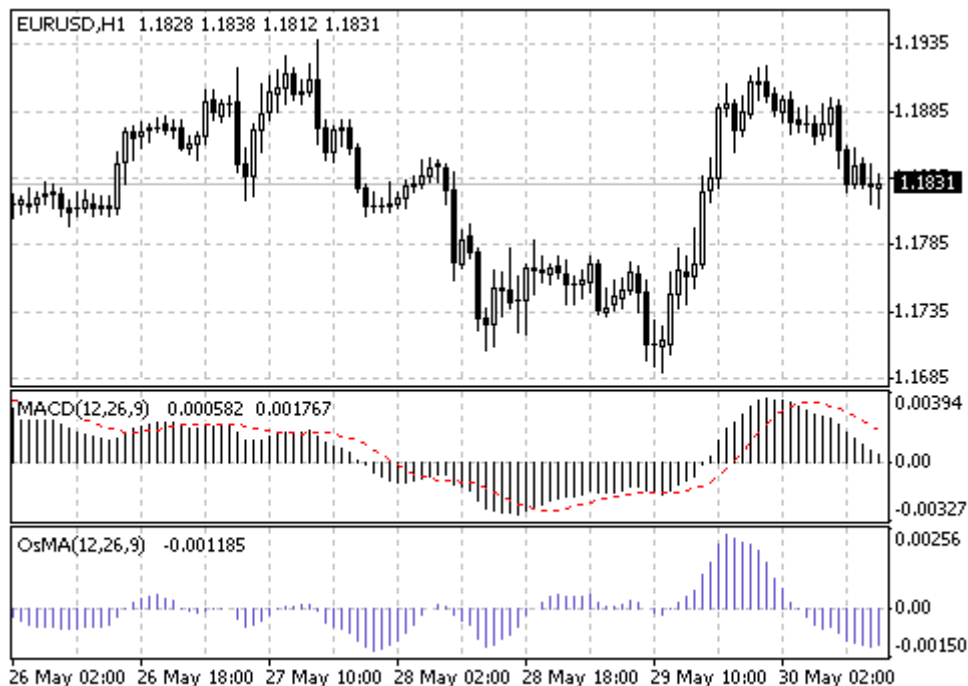
SMA — the Simple Moving Average;

SIGNAL — the signal line of the indicator

Market Facilitation Index (BW MFI)

BW MFI (Bill Williams Market Facilitation Index) is the indicator which shows the change of price for 1 tick. Absolute values of the indicator do not mean anything as they are, only indicator changes have sense. Bill Williams emphasizes the interchanging of MFI and volume:

- MFI increases and volume increases - this points out that: a) the number of players coming into the market increases (volume increases), b) the new coming players open positions in the direction of bar development, i.e., the movement has begun and picks up speed.
- MFI falls and volume falls. It means the market participants are not interested anymore.
- MFI increases, but the volume falls. It is most likely, that the market is not supported with the volume from clients, and the price is changing due to traders' (brokers and dealers) "on the floor" speculations.
- MFI falls, but the volume increases. This is the battle between bulls and bears where the volume of buying and selling is large, but movements of the price itself are insignificant as a result of powers being approximately equal. One of the fighting parties (buyers against sellers) will win. Usually, the break of such a bar lets you know if this bar determines the continuation of the trend or annuls the trend. Bill Williams calls such bar "curtsying".



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Calculation:

To calculate Market Facilitation Index you need to subtract the lowest bar price from the highest bar price and divide it by the volume.

$$\text{BW MFI} = \text{RANGE} * (\text{HIGH} - \text{LOW}) / \text{VOLUME}$$

Where:

RANGE — is the multiplication factor, which brings the difference in points down to whole numbers

Momentum

The Momentum indicator measures the value of the commodity price change during a certain period.

These are the basic methods of use this indicator:

- As an oscillator following the tendency, like MACD. In this case, the signal to buy appears if the indicator makes trough and begins to grow; the signal to sell appears if it comes up to its peak and turns downwards. To define the turning points of the indicator it is better to use its short moving average. The extremely high or low values of the Momentum indicator presume that the current tendency will continue. So, if the indicator reaches the extremely high values and then turns downwards, the coming price increasing should be expected. But, in any case, one should not open/close position before the prices confirm the signal of the indicator.
- As a leading indicator. This method is based on the presuming that the final phase of upward tendency is usually accompanied with sheer price increase (since everybody believes that it will continue), and the closing of the bears' market is usually accompanied with sheer fall in prices (since everybody seeks after leaving the market). This happens very often in this way, but it is still a too sweeping generalization.



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Calculation:

Momentum is calculated as a ratio of today's price to the price several (N) periods ago.

$$\text{MOMENTUM} = \text{CLOSE}(i) / \text{CLOSE}(i-N) * 100$$

Where:

CLOSE(i) — is the closing price of the current bar;

CLOSE(i-N) — is the closing bar price N periods ago

Money Flow Index (MFI)

MFI (Money Flow Index) is an indicator showing the intensity the money is invested in a commodity or taken out of it. Forming and interpreting this indicator are similar to those of RSI, the only difference is that the MFI takes volume into consideration, as well.

When analyzing the MFI the following should be taken into account:

- divergences between indicator and price movement. If prices increase and MFI falls (or vice versa), the probability of price turning is very high.
- MFI values higher than 80 and lower than 20 signalizes respectively about potential peak or foundation of the market.



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Calculation:

The calculation of Money Flow Index includes several stages. At first one defines the typical price (TP) of the period in question.

$$TP = (HIGH + LOW + CLOSE) / 3$$

Then one calculates the amount of the Money Flow (MF):

$$MF = TP * VOLUME$$

If today's typical price is larger than yesterday's TP, then the money flow is considered positive. If today's typical price is lower than that of yesterday, the money flow is considered negative.

A positive money flow is a sum of positive money flows for a selected period of time. A negative money flow is the sum of negative money flows for a selected period of time.

Then one calculates the money ratio (MR) by dividing the positive money flow by the negative money flow: $MR = \text{Positive Money Flow (PMF)} / \text{Negative Money Flow (NMF)}$

And finally, one calculates the money flow index using the money ratio: $MFI = 100 - (100 / (1 + MR))$

Moving Average (MA)

The Moving Average Technical Indicator shows the mean instrument price value for a certain period of time. When one calculates the moving average, one averages out the instrument price for this time period. As the price changes, its moving average either increases, or decreases.

There are four different types of moving averages: Simple (also referred to as Arithmetic), Exponential, Smoothed and Linear Weighted. Moving averages may be calculated for any sequential data set, including opening and closing prices, highest and lowest prices, trading volume or any other indicators. It is often the case when double moving averages are used.

The only thing where moving averages of different types diverge considerably from each other, is when weight coefficients, which are assigned to the latest data, are different. In case we are talking of simple moving average, all prices of the time period in question, are equal in value. Exponential and Linear Weighted Moving Averages attach more value to the latest prices.

The most common way to interpreting the price moving average is to compare its dynamics to the price action. When the instrument price rises above its moving average, a buy signal appears, if the price falls below its moving average, what we have is a sell signal.

This trading system, which is based on the moving average, is not designed to provide entrance into the market right in its lowest point, and its exit right on the peak. It allows to act according to the following trend: to buy soon after the prices reach the bottom, and to sell soon after the prices have reached their peak.

Moving averages may also be applied to indicators. That is where the interpretation of indicator moving averages is similar to the interpretation of price moving averages: if the indicator rises above its moving average, that means that the ascending indicator movement is likely to continue: if the indicator falls below its moving average, this means that it is likely to continue going downward.

Here are the types of moving averages on the chart:

- Simple Moving Average (SMA)
- Exponential Moving Average (EMA)
- Smoothed Moving Average (SMMA)
- Linear Weighted Moving Average (LWMA)



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Calculation:

Simple Moving Average (SMA)

Simple, in other words, arithmetical moving average is calculated by summing up the prices of instrument closure over a certain number of single periods (for instance, 12 hours). This value is then divided by the number of such periods.

$$\text{SMA} = \text{SUM}(\text{CLOSE}, \text{N})/\text{N}$$

Where:

N — is the number of calculation periods.

Exponential Moving Average (EMA)

Exponentially smoothed moving average is calculated by adding the moving average of a certain share of the current closing price to the previous value. With exponentially smoothed moving averages, the latest prices are of more value. P-percent exponential moving average will look like:

$$\text{EMA} = (\text{CLOSE}(i) * P) + (\text{EMA}(i-1) * (100-P))$$

Where:

CLOSE(i) — the price of the current period closure;

EMA(i-1) — Exponentially Moving Average of the previous period closure;

P — the percentage of using the price value.

Smoothed Moving Average (SMMA)

The first value of this smoothed moving average is calculated as the simple moving average (SMA):

$$\text{SUM1} = \text{SUM}(\text{CLOSE}, \text{N})$$

$$\text{SMMA1} = \text{SUM1}/\text{N}$$

The second and succeeding moving averages are calculated according to this formula:

$$\text{SMMA}(i) = (\text{SUM1} - \text{SMMA1} + \text{CLOSE}(i))/\text{N}$$

Where:

SUM1 — is the total sum of closing prices for N periods;

SMMA1 — is the smoothed moving average of the first bar;

SMMA(i) — is the smoothed moving average of the current bar (except for the first one);

CLOSE(i) — is the current closing price;

N — is the smoothing period.

Linear Weighted Moving Average (LWMA)

In the case of weighted moving average, the latest data is of more value than more early data. Weighted moving average is calculated by multiplying each one of the closing prices within the considered series, by a certain weight coefficient.

$$\text{LWMA} = \text{SUM}(\text{Close}(i) * i, \text{N})/\text{SUM}(i, \text{N})$$

Where:

SUM(i, N) — is the total sum of weight coefficients

Moving Average of Oscillator

Moving Average of Oscillator is, in general case, the difference between the oscillator and the smoothing of oscillator. In this case, the basic line of MACD is used as an oscillator, and the signal line of MACD is used for smoothing.

$$\text{OSMA} = \text{MACD} - \text{SIGNAL}$$



On Balance Volume

On Balance Volume Technical Indicator (OBV) is a momentum technical indicator that relates volume to price change. The indicator, which Joseph Granville came up with, is pretty simple. When the security closes higher than the previous close, all of the day's volume is considered up-volume. When the security closes lower than the previous close, all of the day's volume is considered down-volume.

The basic assumption, regarding On Balance Volume analysis, is that OBV changes precede price changes. The theory is that smart money can be seen flowing into the security by a rising OBV. When the public then moves into the security, both the security and the On Balance Volume will surge ahead.

If the security's price movement precedes OBV movement, a "non-confirmation" has occurred. Non-confirmations can occur at bull market tops (when the security rises without, or before, the OBV) or at bear market bottoms (when the security falls without, or before, the On Balance Volume Technical Indicator).

The OBV is in a rising trend when each new peak is higher than the previous peak and each new trough is higher than the previous trough. Likewise, the On Balance Volume is in a falling trend when each successive peak is lower than the previous peak and each successive trough is lower than the previous trough. When the OBV is moving sideways and is not making successive highs and lows, it is in a doubtful trend.

Once a trend is established, it remains in force until it is broken. There are two ways in which the On Balance Volume trend can be broken. The first occurs when the trend changes from a rising trend to a falling trend, or from a falling trend to a rising trend.

The second way the OBV trend can be broken is if the trend changes to a doubtful trend and remains doubtful for more than three days. Thus, if the security changes from a rising trend to a doubtful trend and remains doubtful for only two days before changing back to a rising trend, the On Balance Volume is considered to have always been in a rising trend.

When the OBV changes to a rising or falling trend, a "breakout" has occurred. Since OBV breakouts normally precede price breakouts, investors should buy long on On Balance Volume upside breakouts. Likewise, investors should sell short when the OBV makes a downside breakout. Positions should be held until the trend changes.



Calculation

If today's close is greater than yesterday's close then: $OBV(i) = OBV(i-1) + VOLUME(i)$

If today's close is less than yesterday's close then: $OBV(i) = OBV(i-1) - VOLUME(i)$

If today's close is equal to yesterday's close then: $OBV(i) = OBV(i-1)$

Where:

OBV(i) — is the indicator value of the current period;

OBV(i-1) — is the indicator value of the previous period;

VOLUME(i) — is the volume of the current bar

Parabolic SAR

Parabolic SAR Technical Indicator was developed for analyzing the trending markets. The indicator is constructed on the price chart. This indicator is similar to the Moving Average Technical Indicator with the only difference that Parabolic SAR moves with higher acceleration and may change its position in terms of the price. The indicator is below the prices on the bull market (Up Trend), when it's bearish (Down Trend), it is above the prices.

If the price crosses Parabolic SAR lines, the indicator turns, and its further values are situated on the other side of the price. When such an indicator turn does take place, the maximum or the minimum price for the previous period would serve as the starting point. When the indicator makes a turn, it gives a signal of the trend end (correction stage or flat), or of its turn.

The Parabolic SAR is an outstanding indicator for providing exit points. Long positions should be closed when the price sinks below the SAR line, short positions should be closed when the price rises above the SAR line. It is often the case that the indicator serves as a trailing stop line.

If the long position is open (i.e., the price is above the SAR line), the Parabolic SAR line will go up, regardless of what direction the prices take. The length of the SAR line movement depends on the scale of the price movement.



Calculation:

$$\text{SAR}(i) = \text{SAR}(i-1) + \text{ACCELERATION} * (\text{EPRICE}(i-1) - \text{SAR}(i-1))$$

Where:

SAR(i-1) — is the value of the indicator on the previous bar;

ACCELERATION — is the acceleration factor;

EPRICE(i-1) — is the highest (lowest) price for the previous period (EPRICE=HIGH for long positions and EPRICE=LOW for short positions).

The indicator value increases if the price of the current bar is higher than previous bullish and vice versa. The acceleration factor (ACCELERATION) will double at the same time, which would cause Parabolic SAR and the price to come together. In other words, the faster the price grows or sinks, the faster the indicator approaches the price.

Relative Strength Index

The Relative Strength Index Technical Indicator (RSI) is a price-following oscillator that ranges between 0 and 100. When Wilder introduced the Relative Strength Index, he recommended using a 14-day RSI. Since then, the 9-day and 25-day Relative Strength Index indicators have also gained popularity.

A popular method of analyzing the RSI is to look for a divergence in which the security is making a new high, but the RSI is failing to surpass its previous high. This divergence is an indication of an impending reversal. When the Relative Strength Index then turns down and falls below its most recent trough, it is said to have completed a "failure swing". The failure swing is considered a confirmation of the impending reversal.

Ways to use Relative Strength Index for chart analysis:

- **Tops and bottoms**
The Relative Strength Index usually tops above 70 and bottoms below 30. It usually forms these tops and bottoms before the underlying price chart;
- **Chart Formations**
The RSI often forms chart patterns such as head and shoulders or triangles that may or may not be visible on the price chart;
- **Failure swing (Support or Resistance penetrations or breakouts)**
This is where the Relative Strength Index surpasses a previous high (peak) or falls below a recent low (trough);
- **Support and Resistance levels**
The Relative Strength Index shows, sometimes more clearly than price themselves, levels of support and resistance.
- **Divergences**
As discussed above, divergences occur when the price makes a new high (or low) that is not confirmed by a new high (or low) in the Relative Strength Index. Prices usually correct and move in the direction of the RSI.



Calculation:

$$RSI = 100 - (100 / (1 + U/D))$$

Where:

U — is the average number of positive price changes;

D — is the average number of negative price changes.

Relative Vigor Index

The main point of Relative Vigor Index Technical Indicator (RVI) is that on the bull market the closing price is, as a rule, higher, than the opening price. It is the other way round on the bear market. So the idea behind Relative Vigor Index is that the vigor, or energy, of the move is thus established by where the prices end up at the close. To normalize the index to the daily trading range, divide the change of price by the maximum range of prices for the day. To make a more smooth calculation, one uses Simple Moving Average. 10 is the best period. To avoid probable ambiguity one needs to construct a signal line, which is a 4-period symmetrically weighted moving average of Relative Vigor Index values. The concurrence of lines serves as a signal to buy or to sell.



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Calculation:

$$RVI = (CLOSE - OPEN) / (HIGH - LOW)$$

Where:

- OPEN — is the opening price;
- HIGH — is the maximum price;
- LOW — is the minimum price;
- CLOSE — is the closing price.

Standard Deviation

Standard Deviation — value of the market volatility measurement. This indicator describes the range of price fluctuations relative to simple moving average. So, if the value of this indicator is high, the market is volatile, and prices of bars are rather spread relative to the moving average. If the indicator value is low, the market can be described as having a low volatility, and prices of bars are rather close to the moving average.

Normally, this indicator is used as a constituent of other indicators. Thus, when calculating Bollinger Bands, one has to add the symbol standard deviation value to its moving average.

Calculation:

$$StdDev = \sqrt{\frac{\sum (CLOSE - SMA(CLOSE, N))^2}{N}}$$

Where:

- SQRT — square root;
- SUM (... , N) — sum within N periods;
- SMA (... , N) — simple moving average having the period of N;
- N — calculation period.

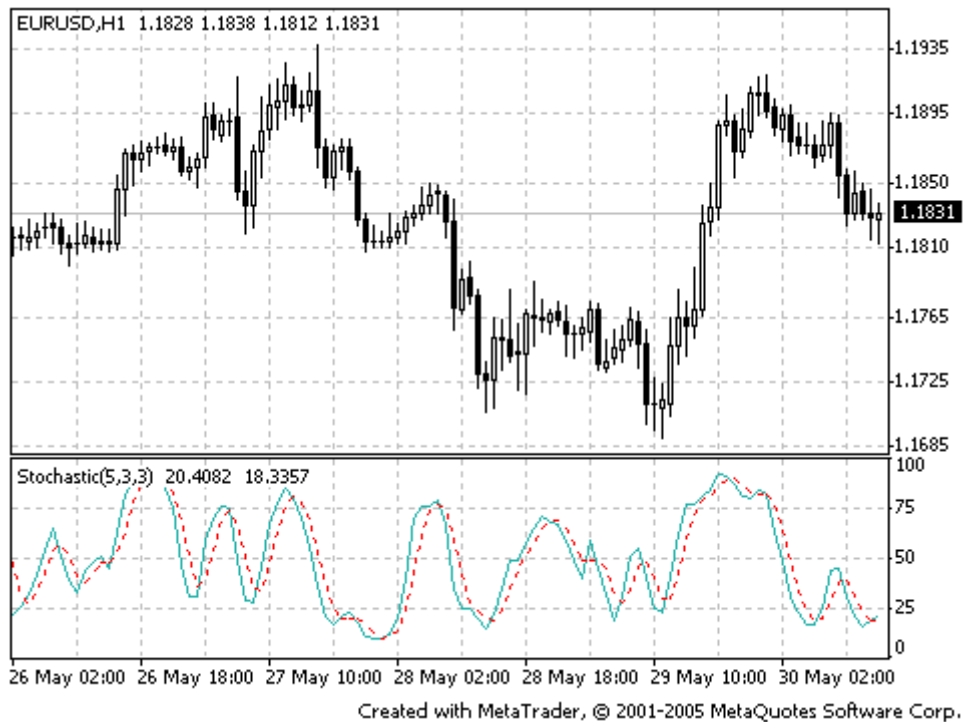
Stochastic Oscillator

The Stochastic Oscillator Technical Indicator compares where a security's price closed relative to its price range over a given time period. The Stochastic Oscillator is displayed as two lines. The main line is called

%K. The second line, called %D, is a Moving Average of %K. The %K line is usually displayed as a solid line and the %D line is usually displayed as a dotted line.

There are several ways to interpret a Stochastic Oscillator. Three popular methods include:

- Buy when the Oscillator (either %K or %D) falls below a specific level (for example, 20) and then rises above that level. Sell when the Oscillator rises above a specific level (for example, 80) and then falls below that level;
- Buy when the %K line rises above the %D line and sell when the %K line falls below the %D line;
- Look for divergences. For instance: where prices are making a series of new highs and the Stochastic Oscillator is failing to surpass its previous highs.



Calculation:

The Stochastic Oscillator has four variables:

- %K periods. This is the number of time periods used in the stochastic calculation;
- %K Smoothing Periods. This value controls the internal smoothing of %K. A value of 1 is considered a fast stochastic; a value of 3 is considered a slow stochastic;
- %D periods. This is the number of time periods used when calculating a moving average of %K;
- %D method. The method (i.e., Exponential, Simple, Smoothed, or Weighted) that is used to calculate %D.

The formula for %K is: **$\%K = (\text{CLOSE} - \text{LOW}(\%K)) / (\text{HIGH}(\%K) - \text{LOW}(\%K)) * 100$**

Where:

CLOSE — is today's closing price;
LOW(%K) — is the lowest low in %K periods;
HIGH(%K) — is the highest high in %K periods.

The %D moving average is calculated according to the formula: **$\%D = \text{SMA}(\%K, N)$**

Where:

N — is the smoothing period;
SMA — is the Simple Moving Average.

Williams' Percent Range

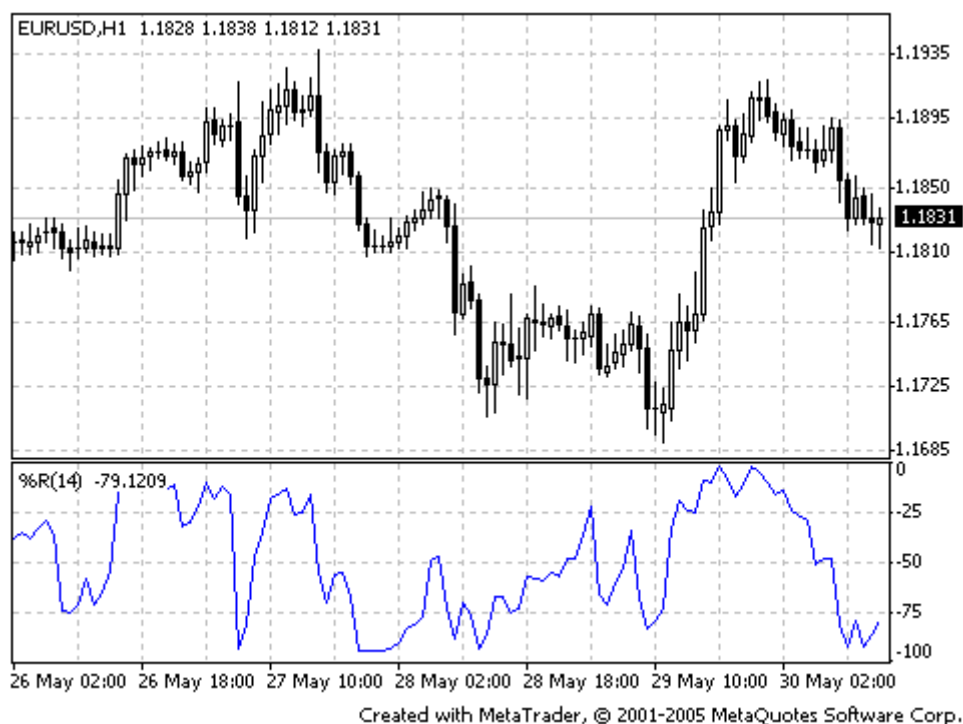
Williams' Percent Range Technical Indicator (%R) is a dynamic technical indicator, which determines whether the market is overbought/oversold. Williams' %R is very similar to the Stochastic Oscillator. The only difference is that %R has an upside down scale and the Stochastic Oscillator has internal smoothing.

To show the indicator in this upside down fashion, one places a minus symbol before the Williams Percent Range values (for example -30%). One should ignore the minus symbol when conducting the analysis.

Indicator values ranging between 80 and 100% indicate that the market is oversold. Indicator values ranging between 0 and 20% indicate that the market is overbought.

As with all overbought/oversold indicators, it is best to wait for the security's price to change direction before placing your trades. For example, if an overbought/oversold indicator is showing an overbought condition, it is wise to wait for the security's price to turn down before selling the security.

An interesting phenomenon of the Williams Percent Range indicator is its uncanny ability to anticipate a reversal in the underlying security's price. The indicator almost always forms a peak and turns down a few days before the security's price peaks and turns down. Likewise, Williams Percent Range usually creates a trough and turns up a few days before the security's price turns up.



Calculation:

Below is the formula of the %R indicator calculation, which is very similar to the Stochastic Oscillator formula:

$$\%R = (\text{HIGH}(i-n) - \text{CLOSE}) / (\text{HIGH}(i-n) - \text{LOW}(i-n)) * 100$$

Where:

CLOSE — is today's closing price;

HIGH(i-n) — is the highest high over a number (n) of previous periods;

LOW(i-n) — is the lowest low over a number (n) of previous periods.

Williams' Alligator

"Most of the time the market remains stationary. Only for some 15–30% of time the market generates trends, and traders who are not located in the exchange itself derive most of their profits from the trends. My Grandfather used to repeat: "Even a blind chicken will find its corns, if it is always fed at the same time". We call the trade on the trend "a blind chicken market". It took us years, but we have produced an indicator, that lets us always keep our powder dry until we reach the blind chicken market"

Bill Williams

In principle, Alligator Technical Indicator is a combination of Balance Lines (Moving Averages) that use fractal geometry and nonlinear dynamics.

- The blue line (Alligator's Jaw) is the Balance Line for the timeframe that was used to build the chart (13-period Smoothed Moving Average, moved into the future by 8 bars);
- The red line (Alligator's Teeth) is the Balance Line for the value timeframe of one level lower (8-period Smoothed Moving Average, moved by 5 bars into the future);
- The green line (Alligator's Lips) is the Balance Line for the value timeframe, one more level lower (5-period Smoothed Moving Average, moved by 3 bars into the future).

Lips, Teeth and Jaw of the Alligator show the interaction of different time periods. As clear trends can be seen only 15 to 30 per cent of the time, it is essential to follow them and refrain from working on markets that fluctuate only within certain price periods.

When the Jaw, the Teeth and the Lips are closed or intertwined, it means the Alligator is going to sleep or is asleep already. As it sleeps, it gets hungrier and hungrier — the longer it will sleep, the hungrier it will wake up. The first thing it does after it wakes up is to open its mouth and yawn. Then the smell of food comes to its nostrils: flesh of a bull or flesh of a bear, and the Alligator starts to hunt it. Having eaten enough to feel quite full, the Alligator starts to lose the interest to the food/price (Balance Lines join together) — this is the time to fix the profit.



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Calculation:

MEDIAN PRICE = (HIGH + LOW) / 2
ALLIGATORS JAW = SMMA (MEDEAN PRICE, 13, 8)
ALLIGATORS TEETH = SMMA (MEDEAN PRICE, 8, 5)
ALLIGATORS LIPS = SMMA (MEDEAN PRICE, 5, 3)

where:

MEDIAN PRICE — median price;

HIGH — the highest price of the bar;

LOW — the lowest price of the bar;

SMMA (A, B, C) — smoothed moving average. A parameter is for data to be smoothed, B is the smoothing period, C is shift to future. For example, SMMA (MEDIAN PRICE, 5, 3) means that the smoothed moving average will be calculated on the median price, smoothing period being equal to 5 bars and shift being 3;

ALLIGATORS JAW — Alligator's jaws (blue line);

ALLIGATORS TEETH — Alligator's teeth (red line);

ALLIGATORS LIPS — Alligator's lips (green line).

Awesome Oscillator

Awesome Oscillator Technical Indicator (AO) is a 34-period simple moving average, plotted through the middle points of the bars $(H+L)/2$, which is subtracted from the 5-period simple moving average, built across the central points of the bars $(H+L)/2$. It shows us quite clearly what's happening to the market driving force at the present moment.

Signals to buy

Saucer

This is the only signal to buy that comes when the bar chart is higher than the nought line. One must bear in mind:

- the saucer signal is generated when the bar chart reversed its direction from the downward to upward. The second column is lower than the first one and is colored red. The third column is higher than the second and is colored green.
- for the saucer signal to be generated the bar chart should have at least three columns.

Keep in mind, that all Awesome Oscillator columns should be over the nought line for the saucer signal to be used.

Nought line crossing

The signal to buy is generated when the bar chart passes from the area of negative values to that of positive. It comes when the bar chart crosses the nought line. As regards this signal:

- for this signal to be generated, only two columns are necessary;
- the first column is to be below the nought line, the second one is to cross it (transition from a negative value to a positive one);
- simultaneous generation of signals to buy and to sell is impossible.

Two pikes

This is the only signal to buy that can be generated when the bar chart values are below the nought line. As regards this signal, please, bear in mind:

- the signal is generated, when you have a pike pointing down (the lowest minimum) which is below the nought line and is followed by another down-pointing pike which is somewhat higher (a negative figure with a lesser absolute value, which is therefore closer to the nought line), than the previous down-looking pike.
- the bar chart is to be below the nought line between the two pikes. If the bar chart crosses the nought line in the section between the pikes, the signal to buy doesn't function. However, a different signal to buy will be generated — nought line crossing.
- each new pike of the bar chart is to be higher (a negative number of a lesser absolute value that is closer to the nought line) than the previous pike.
- if an additional higher pike is formed (that is closer to the nought line) and the bar chart has not crossed the nought line, an additional signal to buy will be generated.

Signals to sell

Awesome Oscillator signals to sell are identical to the signals to buy. The saucer signal is reversed and is below zero. Nought line crossing is on the decrease — the first column of it is over the nought, the second one is under it. The two pikes signal is higher than the nought line and is reversed too.



Calculation:

AO is a 34-period simple moving average, plotted through the central points of the bars $(H+L)/2$, and subtracted from the 5-period simple moving average, graphed across the central points of the bars $(H+L)/2$.

$$\text{MEDIAN PRICE} = (\text{HIGH} + \text{LOW}) / 2$$
$$\text{AO} = \text{SMA}(\text{MEDIAN PRICE}, 5) - \text{SMA}(\text{MEDIAN PRICE}, 34)$$

Where:

SMA — Simple Moving Average.

Acceleration/Deceleration - AC

Acceleration/Deceleration Technical Indicator (AC) measures acceleration and deceleration of the current driving force. This indicator will change direction before any changes in the driving force, which, in its turn, will change its direction before the price. If you realize that Acceleration/Deceleration is a signal of an earlier warning, it gives you evident advantages.

The nought line is basically the spot where the driving force is at balance with the acceleration. If Acceleration/Deceleration is higher than nought, then it is usually easier for the acceleration to continue the upward movement (and vice versa in cases when it is below nought). Unlike in case with Awesome Oscillator, it is not regarded as a signal when the nought line is crossed. The only thing that needs to be done to control the market and make decisions is to watch for changes in color. To save yourself serious reflections, you must remember: you can not buy with the help of Acceleration/Deceleration, when the current column is colored red, and you can not sell, when the current column is colored green.

If you enter the market in the direction of the driving force (the indicator is higher than nought, when buying, or it is lower than nought, when selling), then you need only two green columns to buy (two red columns to sell). If the driving force is directed against the position to be opened (indicator below nought

for buying, or higher than nought for selling), a confirmation is needed, hence, an additional column is required. In this case the indicator is to show three red columns over the nought line for a short position and three green columns below the nought line for a long position.



Calculation:

AC bar chart is the difference between the value of 5/34 of the driving force bar chart and 5-period simple moving average, taken from that bar chart.

$$\text{AO} = \text{SMA}(\text{median price}, 5) - \text{SMA}(\text{median price}, 34)$$
$$\text{AC} = \text{AO} - \text{SMA}(\text{AO}, 5)$$

Where:

SMA — Simple Moving Average;

AO — Awesome Oscillator.

Fractals

All markets are characterized by the fact that on the most part the prices do not change too much, and only short periods of time (15–30 percent) account for trend changes. Most lucrative periods are usually the case when market prices change according to a certain trend.

A Fractal is one of five indicators of Bill Williams' trading system, which allows to detect the bottom or the top.

Fractal Technical Indicator it is a series of at least five successive bars, with the highest HIGH in the middle, and two lower HIGHS on both sides. The reversing set is a series of at least five successive bars, with the lowest LOW in the middle, and two higher LOWs on both sides, which correlates to the sell fractal. The fractals are have High and Low values and are indicated with the up and down arrows.

The fractal needs to be filtrated with the use of Alligator. In other words, you should not close a buy transaction, if the fractal is lower than the Alligator's Teeth, and you should not close a sell transaction, if the fractal is higher than the Alligator's Teeth. After the fractal signal has been created and is in force, which is determined by its position beyond the Alligator's Mouth, it remains a signal until it gets attacked, or until a more recent fractal signal emerges.



Gator Oscillator

Gator Oscillator is based on the Alligator and shows the degree of convergence/divergence of the Balance Lines (Smoothed Moving Averages). The top bar chart is the absolute difference between the values of the blue and the red lines. The bottom bar chart is the absolute difference between the values of the red line and the green line, but with the minus sign, as the bar chart is drawn top-down.

