MarketBrowser™

Studies Reference Guide

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MarketBrowser Studies Reference:

MarketBrowser
Studies Reference Guide

MarketBrowser includes many predefined studies which are described in this appendix. For information on applying these studies to data, see Chapter 2, “Quick Start - Retrieving and Analyzing Data”. You can also create your own custom analytics; for more information, see Chapter 5, “Modifying Charts, Tables and Windows”.

Moving Averages

Moving averages come in many different forms: simple, weighted, displaced, and exponential, but their common purpose is to “smooth” data over a user-defined period in order to reduce the “noise” associated with market data.

Because moving averages are so fundamental to technical analysis, it is important to understand how they are calculated. For example, suppose you have a series that has 100 points. To take a 5-day moving average, you would first take points [1..5], then average them together. The result is the first point in the moving average. The next point is obtained by taking points [2..6], and averaging them together. This is done for all the points in the series. The more points in the moving average, the “smoother” the resulting series will be.

You can access moving averages in MarketBrowser via the menu options: **Studies → Moving Averages → 1 Moving Average, 2 Moving Averages** or **3 Moving Averages**, which plot one, two, or three user-selectable moving averages with a user-defined period over the input series.

When adding moving averages, you can select from among several types, including: Simple, Weighted, Modified, Hamming, Hanning, and Kaiser. The Hamming, Hanning and Kaiser types are similar to the weighted moving average, but use as weighting factors these three spectral analysis functions. For more information, refer to a text on spectral analysis or digital filtering.

Additional options under the **Moving Averages** submenu include:

Displaced Moving Average

Plots a simple moving average over the input series, shifted along the x-axis by *n* time periods.

Weighted Moving Average

A weighted moving average plots a moving average in which the most recent point in the boxcar is assigned the greatest amount of weight, while the oldest point is assigned the least. A weighted moving average ensures that the most recent data affect results more than older data.

$$\text{Weighted Moving Average} = \frac{(PT_n \times W_n) + (PT_{n-1} \times W_{n-1}) \ldots + (PT_1 + W_1)}{W_n + W_{n-1} \cdots + W_1}$$

where

PT_n is the point in the *n* period boxcar.

W_n is the weight corresponding to the boxcar point.

Figure 1: A 30-day weighted moving average

Exponential Moving Average

Similar to a weighted moving average, an exponential moving average (EMA) applies varying weights to the individual points in an *n* period boxcar, placing the most weight on the more recent points and less weight on the oldest. The difference is that with an exponential moving average, the weights are based on an exponential curve.

Suppose that the underlying series is X[t], t = 1..n, and you want to calculate the Y[t] = movavg(X, box, 1, 0, 3, decay_factor), which evaluates to an EMA (see the MarketBrowser *Function Reference* on MOVAVG).

The formula for an EMA will then be, for t from 1 to n:

$$Y_t = \left[\sum_{1}^{t} (1 - \text{decay\_factor})^{t-i} \times X_i \right] \times \text{decay\_factor}$$

Y[t] = {sum for i from 1 to t of ((1-decay_factor)^(t-i))*X[i]}*decay_factor

The decay factor would normally be a value from 0.01 to 0.2

Bands

In technical analysis, a “band” refers to two moving averages (see the section on Moving Averages above) overplotted above and below a data series to create an “envelope.” The amount by which the averages are plotted above or below the series is a function of the band analysis you are using. A common way of using bands is to examine points where the source series breaks out of the band.

Bollinger (Std Dev)

With Bollinger Bands, the original data series is overplotted with a simple *n*-point moving average of the close, and a band composed of two additional series: the moving average plus or minus (+/-) an integer number of standard deviations. To calculate a Bollinger Band, MarketBrowser requires the source data, the number of points in the moving average, and the number of standard deviations by which to offset the moving average bands.

Percentage

With Percentage Bands, the original data series is overplotted with a simple moving average, plus two additional moving averages +/-, which are a user-defined percentage amount off from the simple moving average.

High/Low Envelope

With High/Low Envelopes, the original data series is overplotted with a moving minimum of the lows and a moving maximum of the highs. The first three columns of the source data must contain close, high, and low data, respectively.

Function Reference: MOVAVG, STDEV, MOVMIN, MOVMAX

Channels

Linear Regression

The Linear Regression model calculates the regression through the entire data series using the “least-squares fit” model. The original data series is then overplotted with a channel formed by the linear regression of the series +/- a real number of standard deviations.

Dated Linear Regression

Dated Linear Regression works on the same principle as simple Linear Regression (see above). It differs in that the user is prompted for a time period for which to calculate the linear regression.

Fibonacci

Given a region, MarketBrowser calculates the mean value between the high and the low and draws lines at Fibonacci intervals above and below the median line. The spacing factor ranges between 0 and 1.

Function Reference: LINREG, STDEV**.**

Oscillators

On a fundamental level, all oscillators attempt to quantify the rate at which an instrument’s price changes. The value of an oscillator will range between 0 and 100, or -1 and 1, depending on how it is constructed. Analysts will tend to look for extremes in an oscillator’s position, as a high oscillator could suggest, for example, that a security is overbought and that its price will soon experience a price reversal.

Momentum

Momentum studies calculate the rate of change, i.e., the distance between the current price and the previous price. If the current price is greater than the previous price, the graph shows a positive value; if the current price is smaller than the previous price, the graph shows a negative value. The greater the momentum in any direction, the greater the volatility.

Momentum is sometimes also referred to as the Price R.O.C, or Rate of Change.

Momentum = $X_t - X_{t-1}$

“N” Momentum

Calculates the momentum (rate of change) between the latest price in a boxcar and the price *n* time periods ago.

“N” Momentum = $X_t - X_{t-n}$

Stochastic

The Stochastic Oscillator examines where a security’s price closed relative to its trading range over the last *n* time periods. It was developed following the observation that as prices increase, prices tend to be closer to the upper end of the price range. Conversely, as prices decrease, prices tend toward the lower end of the price range.

The Stochastic consists of two series: the %K and the %D.

$$\%K = 100 \times \left[\frac{(C_t - L_n)}{(H_n - L_n)}\right]$$

where

C_t is today’s close.

L_n is the lowest low over the period *n*.

H_n is the highest high over the period *n*.

The %K line (drawn as the red line in MarketBrowser) simply indicates where a price is in relation to the price range over the selected time period. Readings over 70% indicate that the price is close to the peak, whereas readings under 30% indicate that the price is near the low.

The %D line (drawn as the yellow line in MarketBrowser) is the moving average of the %K line.

$$\%D = 100 \times (movavg(\%\mathrm{K,n}))$$

The %D line is overplotted onto the %K line.

MarketBrowser allows you to calculate both a slow and a fast stochastic. The slow stochastic smoothes the %K line, and the fast stochastic does not.

Acceleration

An acceleration study calculates the rate of change in the momentum.

Acceleration = $(DERIV(DERIV(series)))$

MACD

The Moving Average Convergence Divergence is an overbought/oversold study. It looks at the relationship between a slow and a fast moving average.

The MACD line (usually depicted in red) is the slow moving average of the source data minus the fast moving average of the source data. The second, overplotted, component (usually displayed in yellow) is the moving average of the MACD line, smoothed by a specified number of points.

Figure 2: The MACD Oscillator

Percent R

The Williams %R Indicator is similar to the Stochastic Oscillator; both compare the rate of change between the high and close values in a given time period. The difference between the two is that the William's %R oscillator is inverted

Absolute values of between 80 and 100 % are commonly interpreted as signs of an oversold market, while readings between 0 and 20 % are read as signs of an overbought market.

William's %R = $-100 \times \left[\frac{(C_t - L_n)}{(H_n - L_n)}\right]$

RSI

The RSI, or Relative Strength Indicator, is an indicator that examines the internal strength of a security. It is a price-following oscillator plotted on a vertical scale from 0 to 100.

$$\text{RSI} = 100 - \left(\frac{100}{1 + RS}\right)$$

where

$$\text{RS} = \frac{\text{average of n period closes up}}{\text{average of n period closes down}}$$

If the market has been rising (i.e., the average of the up closes is greater than that of the down closes), the RSI will be high. Conversely, if the market has been falling, the RSI will be low.

Kairi

The Kairi is a traditional Japanese oscillator that charts the rate of change between a series and its moving average.

$$\text{Kairi} = \frac{X - movavg(X)}{movavg(X)}$$

Figure 3: A 30-point Kairi oscillator, based on a simple moving average

Chaikin's Oscillator

Chaikin's Oscillator is the difference between the slow and the fast exponentially weighted moving averages of the Volume Accumulation/Distribution Lines (see the "Price/Volume Studies" section later in this appendix).

Ultimate Oscillator

The Ultimate Oscillator combines three moving averages of different periods. Each moving average is weighted according to the user's judgment. This oscillator protects against false signals that might occur in a single oscillator.

$$\text{Ultimate Oscillator} = \frac{W_1(movavg_1) + W_2(movavg_2) + W_3(movavg_3)}{W_1 + W_2 + W_3}$$

where W is the user-defined weight of the individual moving averages.

Directional Movement

Directional Movement analysis consists of a series of indicators developed by J. Welles Wilder in his book, New Concepts in Technical Trading Systems. Directional Movement analysis attempts to quantify the extent to which a market is directional or its tendency to exhibit a trend.

Positive (+DM)

The +DM study is the moving average of the positive directional index for a specified number of days (normally 14). The current positive directional index is defined as the previous high subtracted from the current high, and divided by the "true range." The +DM is only calculated for periods that closed up from their previous period.

$$+\text{DM} = \frac{H_t - H_{t-1}}{TR}$$

where

H_t is today's high

H_{t-1} is yesterday's high

TR is the true range, defined as the largest of the following:

a) the distance between today's high and today's low,
b) the distance between today's high and yesterday's close
c) the distance between today's low and yesterday's close

Negative (-DM)

The -DM study is the moving average of the negative directional index for a specified number of days (normally 14).The current negative directional index is defined as the current low minus the previous low, divided by the true range within the given time period. The -DM is only calculated for time periods that close lower than the previous time period.

-DM = $\frac{L_t - L_{t-1}}{TR}$

where

L_t is today's Low

L_{t-1} is yesterday's Low

TR is the largest of the following:

a) the distance between today's high and today's low,
b) the distance between today's high and yesterday's close
c) the distance between today's low and yesterday's close

Oscillator (DMO)

The DMO, or Directional Movement Oscillator, is simply the difference between +DM and -DM, multiplied by 100.

DMO = $100 \times ((+DM) - (-DM))$

DM Index (DX)

The Directional Movement Index calculates the extent to which a market is directional over a given time period. It answers the question "Is the market experiencing a trend?" If the DX is high, the market is highly directional; if the DX is low, the market is sideways (i.e., the amount by which the market goes up is close to the amount the market goes down). The DX does *not* indicate in which direction the market is moving.

DX = $100 \times \left|\frac{(+DM) - (-DM)}{(+DM) + (-DM)}\right|$

Average DM Index (ADX)

The Average DM Index, or ADX, is the moving average of the DX, smoothed by a user-defined number of points.

ADX = $movavg(DX, \text{n})$

ADX Rating (ADXR)

The ADXR consists of the ADX of 14 days ago plus the current ADX, which is then divided by 2.

$$\text{ADXR} = \frac{ADX_t + ADX_{t-14}}{2}$$

Overplot +DM, -DM, ADX

This option allows users to overplot the three indicators in one window.

Figure 4: Three directional movement indicators, overplotted in one window.

Commodity Selection Index

The Commodity Selection Index is related to DX and ADXR, except it is used to rate items in the more volatile short term. It is calculated as:

$$\text{ADX Rating} \times \text{moving average of the true range of } P \times \left[100 \times \frac{V}{\sqrt{M}} \times \frac{1}{(150 + C)}\right]$$

where:
P - Price
V - Value of a $.01 Move
M - Margin Requirement
C - Commission

Price Volume Studies

Accumulation/Distribution

The Volume Accumulation and Distribution Indicator adds volume to a cumulative total, depending on where an instrument's price closes in relationship to its daily period mean. If it is above the mean, a percentage of the daily volume is added to a cumulative total. If it is below the daily mean, a percentage of the volume is subtracted from the cumulative total.

$$\text{Volume Accumulation Distribution} = \left[\frac{(C-L)-(H-C)}{(H-L)} \times V\right] + I$$

where:

I is yesterday's accumulation/distribution value.
V is the Volume
C is the Close
L is the Low
H is the High

On-Balance Volume

The On-Balance Volume indicator adds volume to a cumulative total when an instrument's price goes up, and subtracts it from a cumulative total when it goes down. The formula is:

If today's close > yesterday's close
OBV = `yesterday's OBV + today's volume`

If today's close < yesterday's close
OBV = `yesterday's OBV - today's volume`

If today's close = yesterday's close
OBV = `yesterday's OBV`

Figure 5: On-balance volume

Price/Volume Trend

Referred to as the PVT, the Price/Volume Trend Indicator is similar to the On-Balance Volume indicator (OBV). However, instead of directly adding or subtracting the total volume to or from a cumulative total, the PVT first determines whether the security's price went up or down in the preceding period and calculates the portion of the daily volume to add to the cumulative total.

$$\text{PVT} = \left[\left(\frac{C_t - C_{t-1}}{C_{t-1}}\right) \times V\right] + I$$

where

I is yesterday's PVT indicator
C is the Close
V is the Volume

Positive Volume Index

The Positive Volume Index (PVI) adds volume to a cumulative total if the current period's volume is greater than the previous period's. If volume decreases over that period, nothing is added to the cumulative total. If volume increases, the PVI is increased by the percentage change in the security's price, as defined by taking the rate of change between today's and yesterday's close values.

If yesterday's volume < today's volume

$$\text{PVI} = \left[\left(\frac{C_t - C_{t-1}}{C_{t-1}}\right) \times I\right] + I$$

if yesterday's volume ≥ today's volume

PVI = yesterday's cumulative volume total

Negative Volume Index

The Negative Volume Index (NVI) adds volume to a cumulative total when the volume decreases. The amount added to the cumulative total is taken from the percentage change in a security's price over a given period.

If yesterday's volume > today's volume

$$\text{NVI} = \left[\left(\frac{C_t - C_{t-1}}{C_{t-1}}\right) \times I\right] + I$$

if yesterday's volume ≤ today's volume

NVI = yesterday's cumulative volume total

Volatilities and Correlations

Historical Volatility

The Historical Volatility of an instrument is calculated by taking the log of the Rate of Change of a security in a given time period, then normalizing the data to comply with a 5 day week. This is performed as a moving study. Results fall between 0 and 1.

$$\text{Historical Volatility} = \left[\log\left(\frac{C_t - C_{t-n}}{C_{t-n}}\right)\right] \times \sqrt{\left(\frac{5}{7} \times 365\right)}$$

Standard Deviation

N Day moving standard deviation. The standard deviation is considered a useful indicator of volatility.

$$\text{Standard Deviation} = \sqrt{\frac{\sum_{i = x_{t-(n-1)}}^{x_t} (i - \bar{x})^2}{n - 1}}$$

Figure 6: A 30-point moving standard deviation

Variance

N Day moving variance. The mean square deviation of a price from the average. Low variance indicates that the security is priced close to the average (true) price, while higher variance indicates an overbought/oversold security.

$$\text{Variance} = \sum_{i = x_{t-(n-1)}}^{x_t} \frac{(i - \bar{x})^2}{n-1}$$

Lagged Returns

The absolute return since n time periods ago.

$$\text{Lagged Return} = \frac{X_t}{X_{t-n}}$$

Volatility Index

The Volatility Index calculates the simple moving average of the true range of a CHLO series. The author of this indicator is J. Welles Wilder.

Volatility Index = *moving average(TR,n)*

where

TR is the true range, defined as the largest of the following:

a) the distance between today's high and today's low,
b) the distance between today's high and yesterday's close
c) the distance between today's low and yesterday's close

Chaikin's Volatility

Chaikin's Volatility compares the spread between a security's high and low prices, then multiplies it by the rate of change over a user-defined period.

$$\text{Chaikin's Volatility} = movavg(H - L) \times \left(\frac{C_t - C_{t-n}}{C_{t-n}}\right)$$

Pearson Correlation

The Pearson Correlation is a scaled correlation estimator, which examines how closely correlated over time two series are to one another. Results range from -1 to 1. A correlation of 1 indicates that the two series have a perfect positive correlation, while a correlation of -1 indicates that they have a perfect negative correlation.

Figure 7: A moving Pearson Correlation

Volatility Correlation

A moving correlation of how correlated the volatilities of two instruments are. Values range between -1 and 1.

Indicators

Typical Price

The typical price is calculated by summing the close, high, and low of a series, and dividing by 3.

$$\text{Typical Price} = \frac{H + L + C}{3}$$

Median Price

The Median Price of a security is calculated by adding the security's High and Low prices, then diving it by 2.

$$\text{Median Price} = \frac{H + L}{2}$$

Performance Indicator

The Performance Indicator displays a security's price performance as a percentage. It displays the percent the security has moved since the first data point in the series.

Performance = $100 \times \left[\left(\frac{X_n}{X_0}\right) - 1\right]$

Rate of Change

Rate of Change (ROC) expresses the percent by which a security has moved in a given time period.

ROC = $\frac{X_t - X_{t-n}}{X_{t-n}}$

TRIX

The TRIX displays the rate of change from a triple exponentially smoothed moving average.

TRIX = $ROC(ema(ema(ema(X))))$

where

ROC is the rate of change

ema is an *n*-day exponentially weighted moving average

Weighted Close

The Weighted Close is calculated by multiplying the close by 2, adding the high and the low, and dividing the whole by 4.

Weighted Close = $\frac{(C \times 2) + H + L}{4}$

Swing Index

The swing index isolates the "real" price of a security by comparing relationships between current prices and the period's previous prices. An abstract of the swing index algorithm is:

Swing Index = $50 \times \left[\frac{C_{t-1} - C_t + 0.5(C_t - O_t + 0.25(C_{t-1} - O_{t-1}))}{R}\right] \times \frac{K}{L}$

where

H_{t-1} Yesterday's high price

L_{t-1} Yesterday's low price

C_t Today's close price

C_{t-1} Yesterday's close price

O_t Today's open price

O_{t-1}	Yesterday’s open price
K	The largest of $H_{t-1} - C_t$ and $L_{t-1} - C_t$
L	The value of the limit move
R	Variable based on the relationship between today’s close price and yesterday’s high and low prices

Parabolic SAR

The Parabolic SAR is sometimes called the stop-and-reversal indicator because it tries to indicate points at which you should try to exit out of one market and enter into another.

The SAR accelerates at a particular rate as long as the underlying security is moving in one direction, as indicated by either a higher high or a lower low. If the new current high does not surpass the previous high, or if the new low is not lower than the previous low, the SAR does not accelerate, but increases at the same rate. The SAR line crossing the security’s price plot indicates a reversal.

Commodity Channel Index

The Commodity Channel Index first determines the difference between the mean price of the series and the average of the mean over time. Then this difference is compared to the average difference over time.

Point and Figure

Point and Figure charts are interesting with respect to other charting options because they completely disregard the passage of time, concentrating instead on the change in prices.

To display a Point and Figure chart, you must supply the *box size* and the number of *reversal points*. The box size is a function of the price of the underlying security. The smaller the box size, the more boxes the Point and Figure chart displays. The reversal amount is an integer that specifies by how many boxes the price of the underlying security must change to cause a reversal and start in a new column.

A column can contain Xs or Os, but never both. If the price rises by the specified box size, MarketBrowser draws an X. Conversely, if the price falls by the specified box size, MarketBrowser draws an O.

To change columns, a price trend must go into reversal by the box size multiplied by the reversal size. For example, if your box size is two, and your reversal size is 3, your price must go against the current trend by 6 points in order to reverse and begin a new column.

Figure 8: A security and its corresponding Point and Figure chart

Zig Zag

The Zig Zag study filters out the changes in the data series that are a minimum user-specified percent.

Money Flow Index

The Money Flow Index tries to measure the strength of money going in and out of a security. It is related to the Relative Strength Index, except that the MFI accounts for volume action in addition to price action.

One component of the MFI is money flow, which compares the average price for the day to the previous day's average price. Positive money flow occurs if today's average price is greater; negative money flow occurs if today's average price is less. The money flow for a particular day is the average price times the volume. The positive and negative money flows used in the equation below are the sum of the positive and negative money flows over the specified period.

MFI = 100 - (100 / (1 + Positive Money Flow / Negative Money Flow))

Support and Resistance

Support and Resistance analyses are annotations with key relationships to user-defined *trendlines*. A trendline is a line connecting two points, usually a succession of high and low points. These analyses are applied to a region that is drawn with a *rubberband box*. By selecting a region, you also implicitly draw an underlying trendline; the trendline results from connecting the high point to the low point diagonal from it.

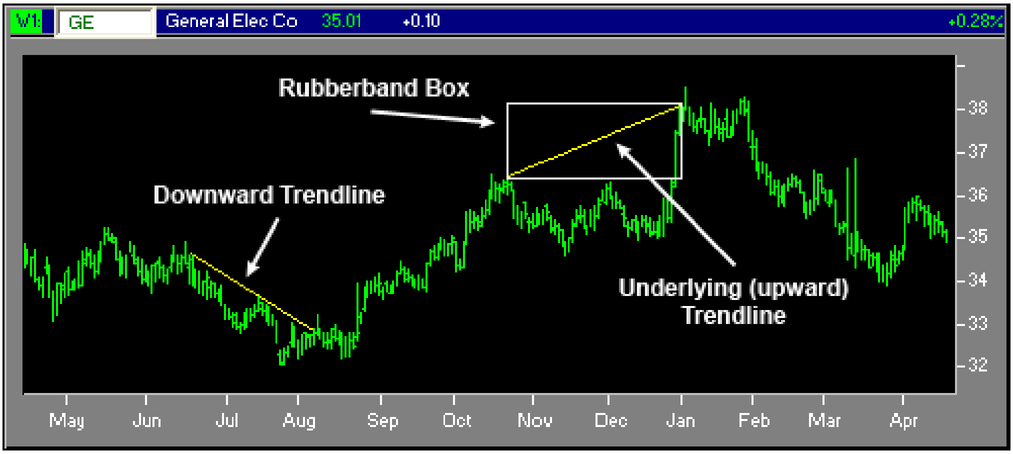

Figure 9: Drawing Support/Resistance lines

Gann Fans

The Gann Fans is a series of lines drawn at Gann angles from a trendline. Gann believed you can predict market movement depending on where a security's plot falls relative to certain key angles. Gann gave special consideration to eighths, and also to thirds. He therefore divides a 90 degree segment into the following angles:

```
1x8 = 12.5% = 82 1/2°
1x4 = 25.0% = 75°
1x3 = 33.0% = 71 1/4°
1x2 = 37.5% = 63 1/4°
1x1 = 50.0% = 45°
```

```
2x1 = 62.5% = 26 1/4°
3x1 = 67.0% = 18 3/4°
4x1 = 75.0% = 15°
8x1 = 87.5% = 7 1/2°
```

Speed Resistance

Speed Resistance lines help you estimate the speed at which a security's price is moving. Given a trendline, two speed resistance lines are drawn: the 1/3 and the 2/3 speedlines. For example, given an upward trendline, the vertical distance from the peak to the start of the trend is divided into thirds. Then lines are drawn from the start of the trendline through the 1/3 and 2/3 points. Speedlines also indicate potential support and resistance levels.

Fibonacci Fans

Fibonacci Fans are three fan lines drawn at Fibonacci intervals of 38.2%, 50.0%, and 61.8%. MarketBrowser draws Fibonacci Fans the way it does speedlines. However, instead of drawing lines at thirds, it draws them at Fibonacci intervals. These three lines are often interpreted as potential indicators of support and resistance levels.

Fibonacci Time Zones

Fibonacci Time Zone Lines are vertical lines drawn at Fibonacci intervals from one another. Fibonacci intervals are: 1, 1, 2, 3, 5, 8, 13, 21, 34, 55, etc. A common interpretation of Fibonacci Time Zones is that a significant price reversal occurs near every Fibonacci Time Zone line. In addition, some people claim that as Fibonacci time zone lines become further apart from one another, price reversals become more dramatic.

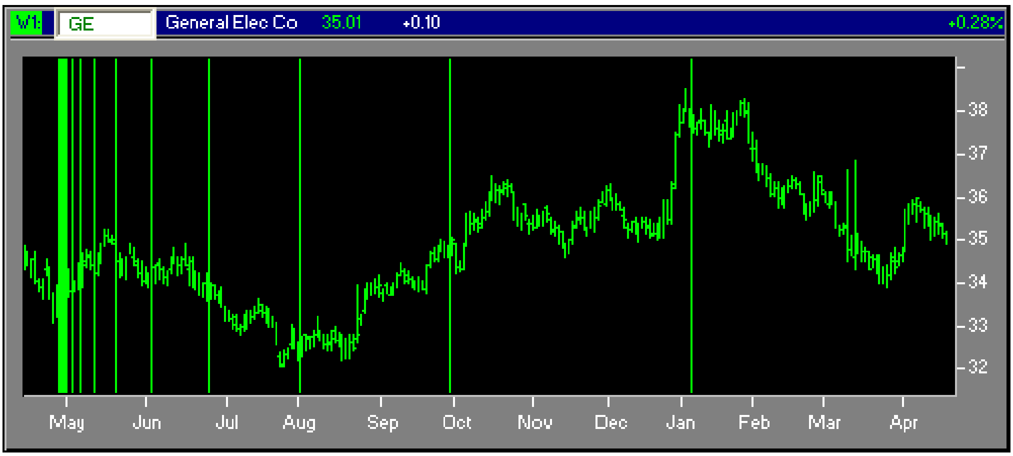

Figure 10: Fibonacci Time Zone lines

Andrew’s Pitchfork

Also called the Median Line Method, Andrew Lines, and Median Line of Resistance. To use this, click to place three points. The leftmost point is drawn directly between the two other points. Then two parallel lines are drawn from the two other points, resulting in three parallel lines that resemble a pitchfork.

Cycle Lines

Cycle lines are vertical lines drawn at set x-axis intervals apart from one another. They help the user identify underlying time cycles dictating market movement. To plot cycle lines, select a region between two important points (usually a succession of valleys) with the rubberband box. Vertical lines are drawn through those two points and at all points on the graph, at the interval set by the rubberband box.

Gann Retracements

Gann Retracement lines are horizontal lines drawn at Gann percentage intervals within the selected region. To plot Gann Retracement lines, you select a region with a rubberband box; lines are then drawn at 33%, 37.5%, 50%, 62.5%, and 67% within this box/region.

Figure 11: Gann Retracement Lines

Fibonacci Retracement

Fibonacci Retracement lines are horizontal lines drawn at percentage intervals within the selected region. To plot Fibonacci Retracement lines, select a region with a rubberband box; MarketBrowser then draws lines at the 38%, 50%, and 61.8% points.).

Quadrant Lines

Quadrant lines divide a user-defined region into four horizontal segments of equal width (25%)

Elliot Wave

A basic Elliot Wave looks like the following picture:

```
             (d)
         *   / \   *
   (b)  / \ /   \ / \
   / \ /   *     *   \
  /  (c)              *
(a)
```

Note that the term "wave" is simply a line segment. For example, a-b.

(a) Pick point a. This is the "anchor" point for the Elliot Wave.

(b) Pick point b. The distance a-b determines the length of each rising wave in the remainder of the Elliot Wave.

(c) Pick point c. The distance b-c determines the length of each falling wave in the remainder of the Elliot Wave.

(d) Pick point d. This point determines the overall height of the wave. When the wave is actually drawn, the top peak may or may not be drawn exactly at point (d) because Elliot Waves come in a fixed pattern. Therefore, depending upon how a-b and b-c are specified, the top peak may not come to point (d). Horizontally, the distance from a-d controls the recursion of the drawing routine. If the ratio of the horizontal distance a-c to a-d is approximately five, a simple Elliot Wave is drawn. In general, that ratio is matched against the closest "permissible" Elliot Wave sequence.

For more information, see <u>Technical Analysis of the Futures Markets</u> by John J. Murphy, New York Institute of Finance, Prentice Hall Company, Chapter 13 - “Elliot Wave Theory,” page 371.

Tirone Levels

Tirone levels are horizontal lines representing the 1/3, 1/2 and 2/3 levels of the selected region.