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Financial Markets as a Deterministic SystemMathematical Proof of the Order behind the Markets

The Power of Strategic Leveraging How to Generate Higher Returns with Leverage Linked to System Performance

Three Tactics to Time & Profit from the SP500

Bust, Malaise or Boom Realizations of an Elliott Wave Analyst

Day Trading Psychology Using Candle Sticks For Precision Trades

The Courage to be a Trade

Trading Truths You Need to Know

Market Snapshot: The Importance of Dominant Sentiment Cycles

Trading Institutional Supply and Demand Patterns

Market Profile(tm) and Auction Market Principles

How to Build and Trade Non-Linear Predictive Cycle Indicators

The Cycle of Kings 70-Year Cycles Converge in 2014--2018

The Sonata Trading Computer

William Delbert Gann

Finding the Bottoms and Tops of the Bollinger Band

Traders World Online Expo #16

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Oct 27th - Nov 21st

Contents

Sep/Oct/Nov 2014 Issue #58

How to Build and Trade Non-Linear Predictive Cyclic Indicators

by Lars von Thienen

Today, according to modern understanding, time is considered to progress in a linear manner. Many theories exist on the nature, origin, end and other matters related to time. Ancient societies also dwelled on questions related to time and formulated concepts and proposed various models to describe their naked eye observations and deductions based on logic.

Most of the ancient societies believed that time progressed in a cyclical manner. They observed the cyclical nature of the day and night, witnessed similar repetitive patterns of seasons year after year, the monthly cycles of the moon and its changing shape, etc., and applied the same concept for larger time scales as well.

In our "western thinking" and "left-brained" world, we always use the linear concept of time. It has become so "normal" in today's world that no one questions it. However, awareness of the consequences can have a tremendous impact when building technical indicators and trading systems.

- ❐ Today and in every charting application, technical analysis is placed in the logic of linear time.

- ❐ Technical analysis is based solely on the linear time concept.

Every TA indicator or study uses the last n-bars period to judge the current condition and to derive trading rules and logics, e.g., RSI(13).

The important question now is: Why don't we use the last n-bars of several years ago instead of using present last n-bars to derive the current condition? (That would be cyclical logic)

Why are the current last n-bars important for judging the current condition? Nobody questions this since we believe that

LINEAR TIME	CYCLICAL TIME
"western thinking" start → middle → end <u>(linear) Technical Analysis:</u> Take the linear last n-bars to rate the present bar.	"ancient thinking"  <u>(cyclical) Technical Analysis:</u> Take the n-bars from the distant past based a chosen cycle to rate the present bar.

Figure 1: Linear vs. cyclical time in technical analysis (TA)

there is only one rule set for time: linear. Hence, all our indicators are based on the linear time concept of our "modern" world.

However, perhaps the bars n-days/years in the past related to a given cycle are more important to rate the present condition than the current last n-bars. This would correspond to the cyclical concept of time. Unfortunately, this idea is not available in any technical analysis platform for building technical indicators.

Figure 1 shows the different approaches to time transferred to the concept of technical analysis:

Let's now transfer the logic of cyclical time into our world of technical analysis, charting and trading systems.

Combination of linear and cyclical time to build predictive indicators

We need to consider two key factors to be able to convert the idea of cyclical time into our "linear" time-based charting and trading logic:

We are using a cyclical time concept for the technical analysis. This means that we will assess the current market condition based on the distant past and not on the current past. So, we are using the same indicator calculation, but are putting in bars from the past instead of from the current linear past. To do so, we need to define a point in time from when to use the data, e.g., 365 bars back instead of 1 bar back.

To be able to use a forecast for trading and charting, we must re-convert the future projection back into a linear time-based forecast for the current next n-bars into the future. Trading in today's world occurs on the right side of the chart in terms of linear time.

Once we understand the basic concept and differences between linear and cyclical time and the impact on the calculation of technical indicators, it will be easy to implement cyclical, non-linear indicators.

I have already introduced 3 important cycles which reflect a recurring pattern that impacts life on Earth: The Metonic cycles introduced and explained in my book "Decoding The Hidden Market Rhyhtm - Part 2: Metonic Cycles". (Book Link: http://amzn.com/1499562594)

The Metonic cycles represent a classical real example of cyclical time since they provide us with a cyclical pattern for the same position of the planets Earth, Moon and Sun before our stars.

The scientific debate concerning the possibility that the position of the Sun and the Earth's magnetosphere affect human behavior is in an early stage and is still ongoing. However, the most significant cycles that affect life on Earth are either geomagnetic or gravitational, and emerge as a result of interactions between the Sun, Moon, and Earth. These interactions influence the operation of our electrochemical nervous system which is linked to the limbic system which in the end controls our emotions.

To rate the cyclic sentiment situation today – or to build the indicator score for today – we will use the bar 8 years, 11 years, and 19 years ago. Not the current last n-bars – they are completely useless if we follow the cyclical time concept.

Based on this concept, we can already build the indicator into the future for as long as the shortest chosen cycle is. In this case, we can calculate the indicator 8 years into the future.

To transfer this concept to an indicator calculation is quite easy. For example, to build a cyclic RSI indicator, we do the following:

a) Calculate the linear-time indicator for the past:
e.g., using a standard RSI(n); (n: length)

b) To build the cyclic-time indicator score, build another indicator that simply uses the outcome from the linear-time indicator and build a composite from the cycles used. For our Metonic RSI indicator, the pseudo code would look like this:

RSI(n) |today, cyclic-time| = (RSI(n)[6939] + RSI(n)[4016]+RSI(n)[2922]) / 3

It takes 19 years (~6939 days) for a similar alignment of the Moon, Sun, and Earth to recur in the sky. The Metonic cycle is a particular approximate common multiple of the solar year and the synodic (lunar) month. There are also two sub-cycles at 11 (~4016 days) and 8 years (~2922 days). That's the reason these values are used to reference the RSI indicator for our cyclic-time based calculation. Patterns and cycles other than Metonic cycles certainly exist. However, I have already outlined the strengths of Metonic cycles in my book.

You can replace the RSI indicator with any one of your favorite indicators to be transformed into cyclical time based version. You have to make sure to you use calendar day charts and deactivate the holiday and weekend filtering.

The following chart is a real-case example that was used in private trading seminars and represent one possible way to interpret a non-linear indicator plot. In these instances, the PercentageR time-based indicator was used to build the cyclic model via the Metonic cycles pattern, keeping to the formula used in the pseudo code presented above. The indicator has been plotted in advance into the future.

One possible way is to look for the maximum and minimum readings of the indicator plot to identify future areas of potential market highs and lows. As the indicator does not provide an exact forecast each day, the first step would be to check the general extremes.

Example Crude oil futures contract – CL

This example shows the crude oil futures contract at the end of 2011 with a full predictive non-linear indicator plot for the course of 2012. Extreme situations are marked with red and green arrows on the chart. The second chart illustrates how this forecast was able to predict the major turning points of crude oil for 2012 in advance.

Building trading systems with cyclical time-based indicators

After witnessing the predictive power of this technique, you can use this concept to build mechanical trading rules based on the created cyclical time-based indicators. For further reading and concrete pseudo code details, I introduce different purely mechanical trading systems in the book "Decoding the Hidden Market Rhythm – Part2: Metonic Cycles" and compare the standard linear time-based model against the cyclical time-based one to demonstrate the predictive advantages of the new non-linear indicators.

Charting platform and the automatic creation of non-linear indicators

No charting platform is able to build non-linear cyclic indicators and transform them into cyclic time for plotting on a trading chart, as the West has a conceptual bias towards linear time. Opening our minds to the concept of cyclical time will present new possibilities and tools for technical analysis. This is part of why I have built the WhenToTrade charting platform, capable of building and plotting non-linear indicators.

A cyclic module for automating the

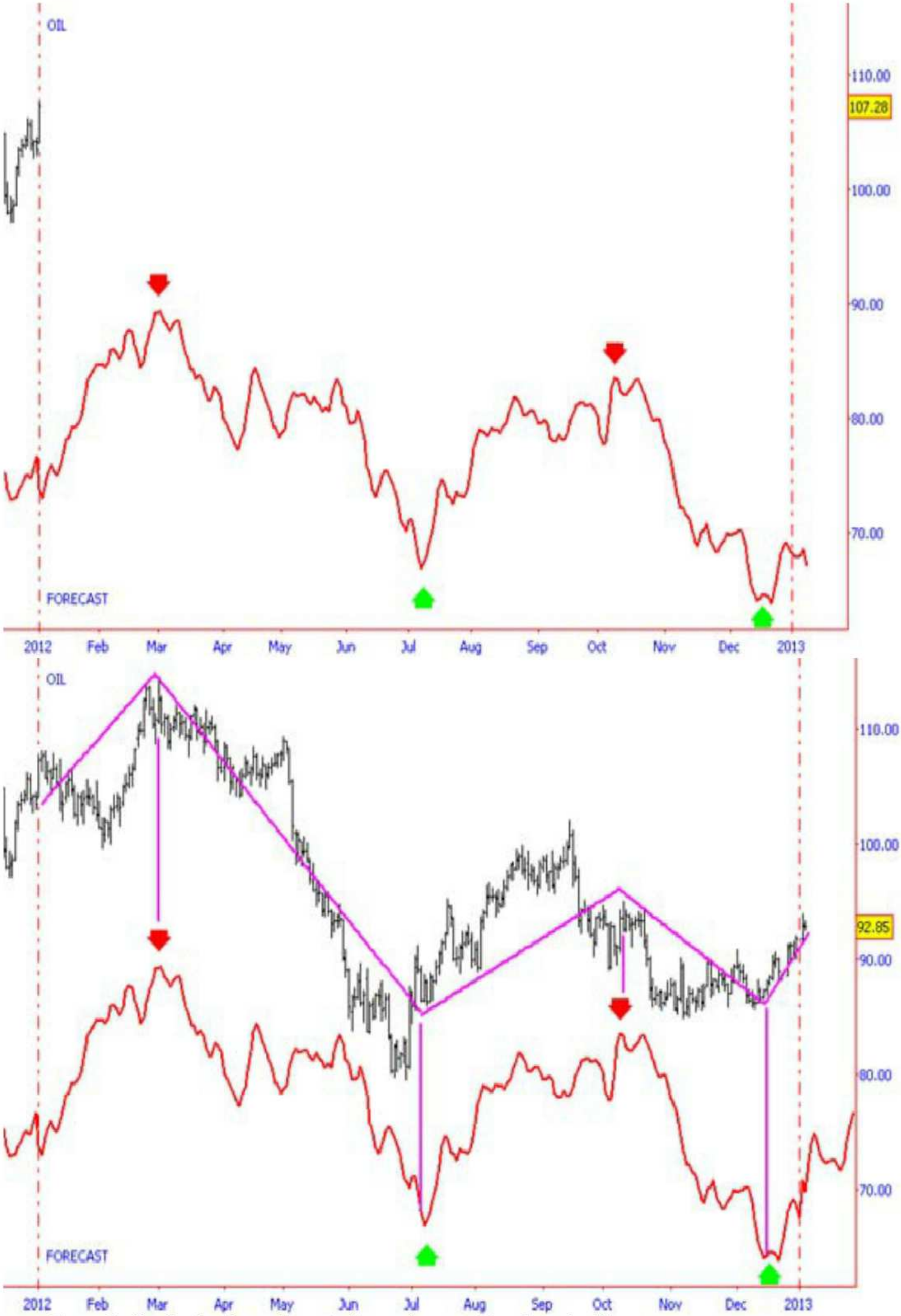


Figure 2a-2b: Crude oil non-linear indicator forecast (a) and results (b) transformation from linear into cyclical time based on any one of a full range of cycles and indicators is available in the WhenToTrade platform. This module will be the first charting platform able to build non-linear predictive indicators and mechanical trading systems. Not limited to daily bars, this concept of cyclic time can be applied to intraday charts, which feature many recurring patterns. Before transforming a linear indicator into its cyclic pendant, it is crucial to define the pattern to be used for the transformation; for example, an intraday sunrise/noon/sunset pattern might be used as a repetitive pattern during a trading day. There are many more possibilities.

I hope I have helped broaden your view beyond the linear time concept; it is merely one of many ways to conceive of time, and I have attempted to show you concretely how to conceptualize others.

Let's finish with reference to a well-known work: "History repeats itself. In order to know and predict the future of anything you only have to look up what has happened in the past and get a correct base or starting point." (W.D. Gann, TUNNEL THRU THE AIR, 1927, Chapter VII: Future Cycles, Page 75ff)

It remains for you now to follow the path of cyclic time in both technical analyses and the stock market.

Lars von Thienen, www.whentotrade.com

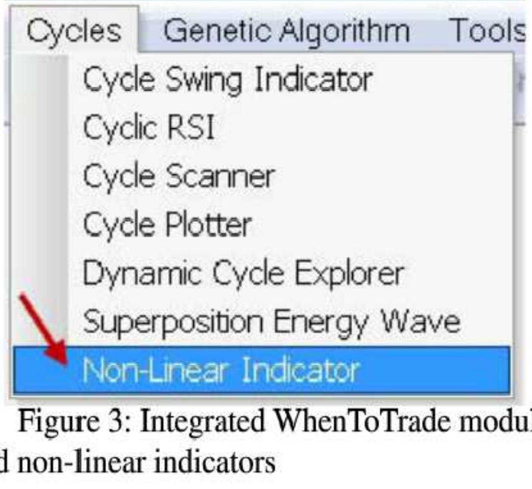
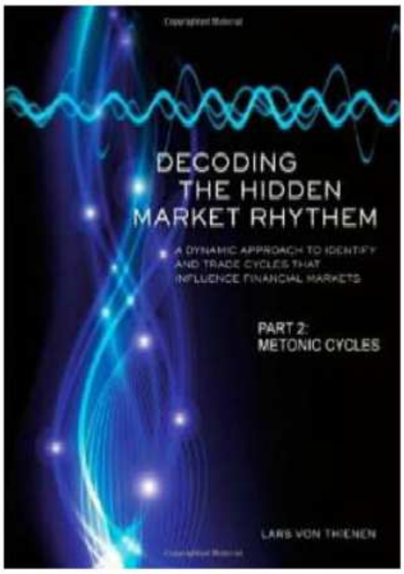


Figure 3: Integrated WhenToTrade module to build non-linear indicators

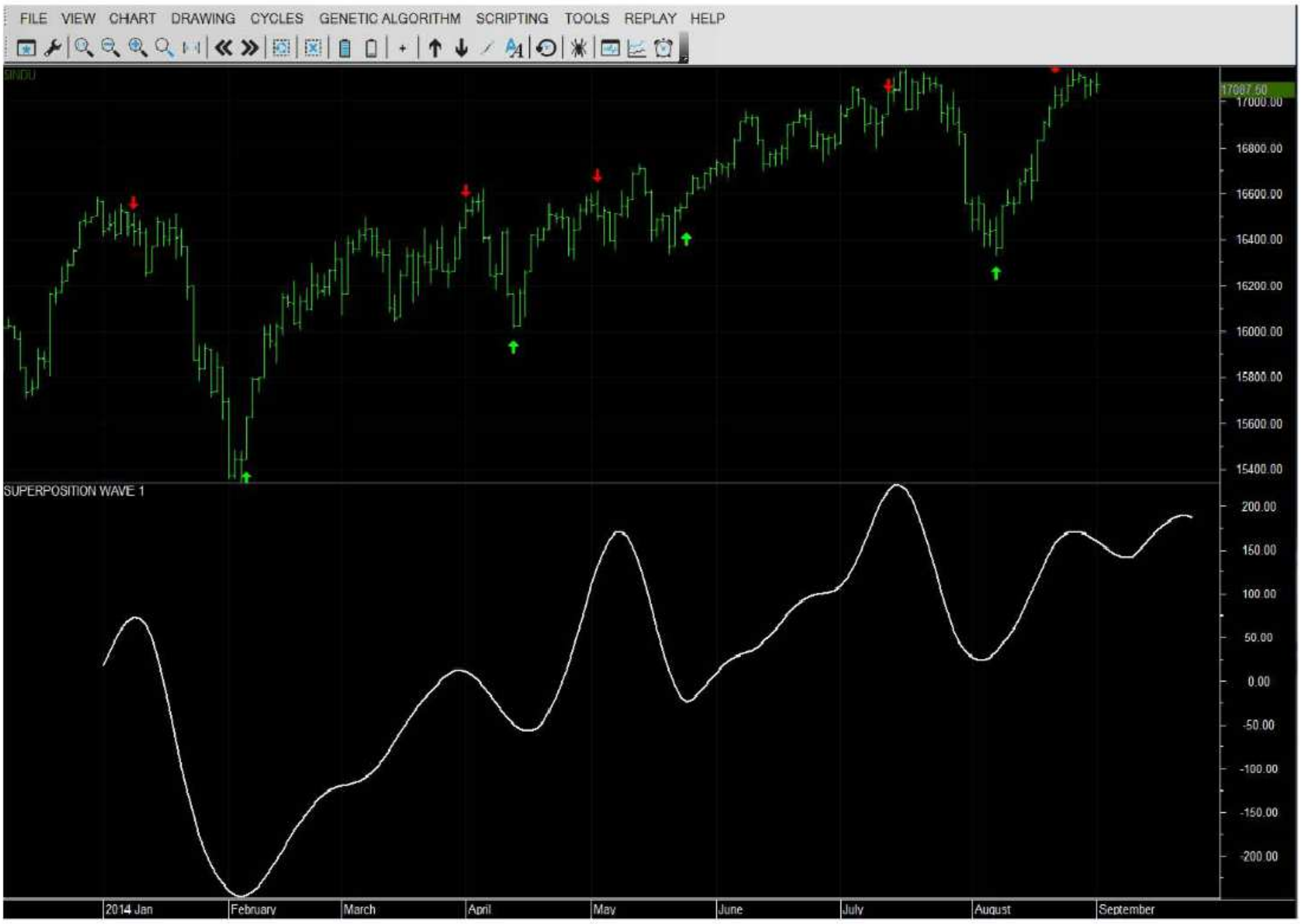
Decoding the Hidden Market Rhythm Part 2: Metonic Cycles by Lars von Thienen



Review by Larry Jacobs

This book is the 2nd book on cycles by the author. This book explores Dynamic Cycles, Metonic Cycles and Genetic Algorithm & Cycles. The author developed a charting program in 2012. This program gives cycle researchers a tool to test and trade various cycles in the markets explained in this book.

The author explains that emotions cause cycles in the market. They swing from positive to negative over time and the markets swing from high to low in response to these emotions. There is also a 2nd part to cycles and that is natural forces also drive emotions. These natural forces are due to the Earth's magnetic field and the Sun's energy cycles combined with the interaction of the moon can affect the motions of human beings. The cycle process that occurs on the Sun and the gravitation impact of the Moon's movement around the



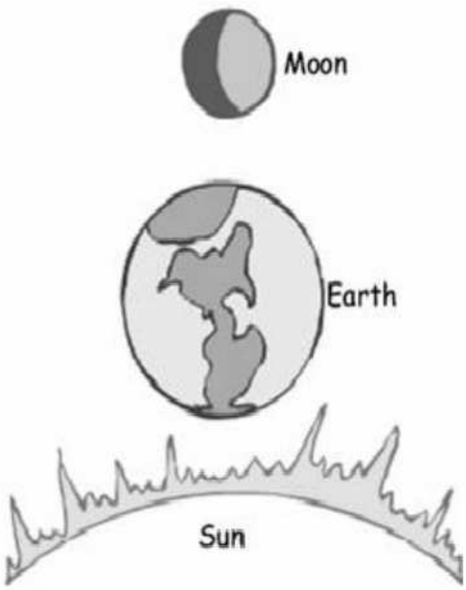
Earth are accompanied by changes in the factors that affect the Earth's atmosphere.

The author explains in this book that the financial markets are driven by emotions that are influenced by the forces of the interactions of the Sun, Moon and Earth. The cyclic movements of the Sun, Moon and Earth repeat over time and this is the hidden rhythm of the market. If we know the hidden rhythm we can then measure the cycles and predict when the cycles occur over time. Also one needs to take into account their actual alignment in the sky/universe. For example one needs to determine the approximate common multiples of synodic lunar months, tropical lunar months and tropical solar years ending at the same time. That is the recurring energy pattern that influences gravitational and geomagnetic forces that drive our emotions and that is called the hidden rhythm.

The author's software program identifies this hidden rhythm in the market. It uses a routine to combine the detected cycles and build a master composite wave for the year in review. See Chart #1.

When you have this composite wave model you can use it to forecast and trade the markets. You have a concrete map with precise days on when to expect the market trend to change. You also get whether to expect a high or low on these trading days. So this is a decoded model for trading the markets. There are various ways to trade it, but the easy way to do it is to just simply trade the decoded dates. You go long on a trough and go short when you are at the top of a cycle.

The author also illustrates an automated trading system based on the theories and concepts elaborated in his book into one tool for use on the trading chart. It is a fully mechanical system. You just trade the turns of the superposition wave.



The author also explains that you can add rules to reduce the risk of the system. That means is the market is in a deep oversold condition and the next predicted trade is to go short then you would reduce the position side. Or if the market is deeply oversold and the next trade is to go long you would increase your position size.

At the end of the book the author introduces a trading system "Metonic Sentiment Index" based technical analysis approach which identifies repeating sentiment patterns. It analyzes the market behavior from the distant past to predict future direction derived from the most important ancient cycles the Metonic cycles. It can isolate this cyclical sentiment pattern and analyzes past stock market developments to forecast future market direction. The book includes a TradeStation EasyLanguage Script code for this indicator and trade strategy.

If you are interested in determining the cycles in the financial markets, I would recommend this book to you. It is available on Amazon at http://www.amazon.com/Decoding-The-Hidden-Market-Rhythm/dp/1499562594

For more information go to: www.WhenToTrade.com