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The Triangular Moving Average. Another Way to Find Support & Resistance Levels.

Presenting and Coding the Triangular Moving Average with its Strategies.

Sofien Kaabar Jan 17 · 7 min read ★

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Moving averages are a great way to provide support and resistance levels among other uses. There are many types of moving averages and in this article, we will discuss the Triangular Moving Average and some strategies revolving around it.

For more on other types of moving averages, feel free to check the below article:

Detecting Support & Resistance Levels With K's Envelopes.
An Improved Version of Moving Averages. A Study in Python.
medium.com

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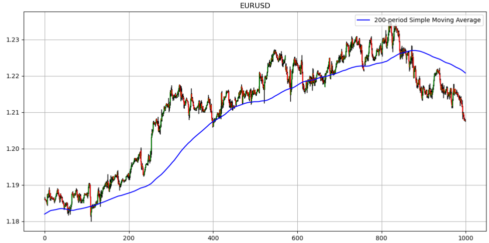
The Concept of Moving Averages

Moving averages help us confirm and ride the trend. They are the most known technical indicator, and this is because of their simplicity and their proven track record of adding value to the analyses. We can use them to find support and resistance levels, stops, and targets, and to understand the underlying trend. This versatility makes them an indispensable tool in our trading arsenal.



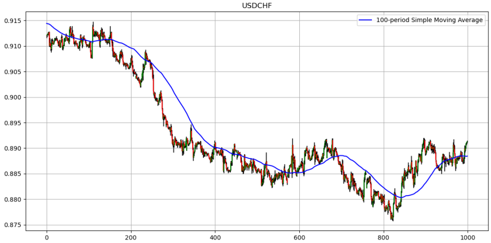
EURUSD hourly data with its 200-period Moving Average. (Image by Author)

As the name suggests, this is your plain simple mean that is used everywhere in statistics and basically any other part in our lives. It is simply the total values of the observations divided by the number of observations. Mathematically speaking, it can be written down as:

$$SMA = \frac{A_1 + A_2 + \cdots + A_n}{n}$$

We can use Python to code a simple moving average easily following this function:

```
def ma(Data, lookback, what, where):
  
  for i in range(len(Data)):
    try:
      Data[i, where] = (Data[i - lookback + 1:i + 1, what].mean())
    
            except IndexError:
                pass
    return Data
```



USDCHF hourly data with its 100-period Moving Average. (Image by Author)

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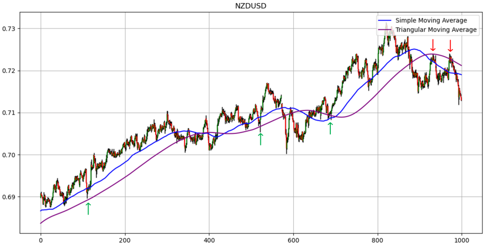
The Triangular Moving Average

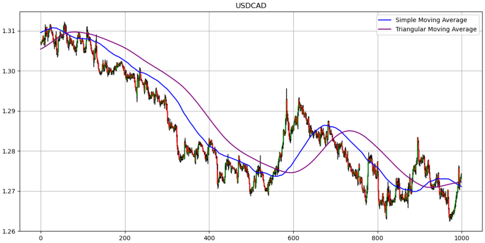
What is called a Triangular Moving Average is simply the moving average of the moving average itself and this is to provide an extra layer of smoothing that can act as a dynamic support or resistance level. Surely it is not as reactive as the first moving average but in stable times, it can provide excellent reactionary levels.

Notice how in the above plot of NZDUSD, the Triangular Moving Average in purple is provide better trading levels. The market seems to prefer this moving average more than the first one (100-period).



NZDUSD with the Simple Moving Average (in blue) and the Triangular Moving Average (in purple). (Image by Author)

The disadvantage of the Triangular Moving Average is that sometimes it tends to be far away from the market price when there is a strong trend. This situation makes it less useful to determine a close support or resistance level. The seen in the plot below on the USDCAD with the first bearish trend. Notice how the simple 100-period moving average is close to the market price and can provide dynamic reactionary levels but the Triangular Moving Average is quite far.



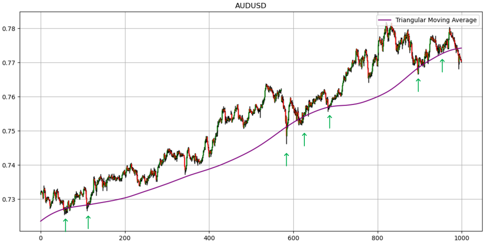
NZDUSD with the Simple Moving Average (in blue) and the Triangular Moving Average (in purple). (Image by Author)

To code the Triangular Moving Average, we simple write the ma function again but apply it on the moving average column.

```
# Consider my_data is the OHLC data array with two extra free columns

my_data = ma(my_data, lookback, closing_price, where_to_put_ma)
my_data = ma(my_data, lookback, where_to_put_ma, where_to_put_tma)

# the variable where_to_put_tma refers to the index of the column
where you want to put the Triangular Moving Average
```



NZDUSD with the Triangular Moving Average (in purple). (Image by Author)

If you are also interested by more technical indicators and using Python to create strategies, then my latest book may interest you:

New Technical Indicators in Python

Amazon.com: New Technical Indicators in Python (9798711128861): Kaabar, Mr Sofien: Books

www.amazon.com

New Technical Indicators in Python

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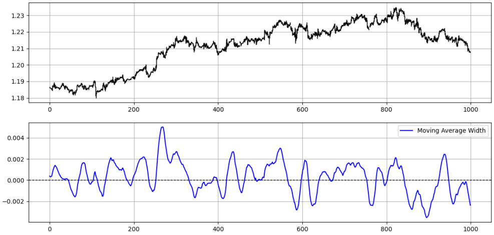
Strategies Using the Triangular Moving Average

The Triangular Moving Average provides many opportunities for strategies. They can be combined with their original moving average or with price to form expected market movements. Let us discuss three different strategies.

- **Strategy 1#: The Moving Average Width**

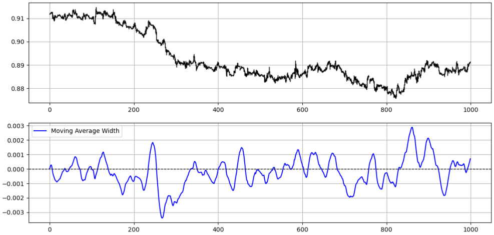
The Moving Average Width method is done by simply calculating the difference between the two moving averages so that we know whenever there is an extreme distance between the two, we can expect a return to normality.



EURUSD hourly data in the first panel with the Moving Average Width in the second panel. (Image by Author)

The idea and trading conditions are:

- **Whenever the width reaches new highs, it signals a possible weakening in the market.**
- **Whenever the width reaches new lows, it signals a possible strength in the market.**

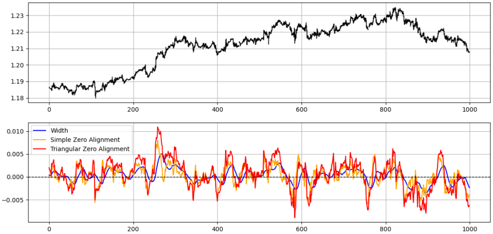


USDCHF hourly data in the first panel with the Moving Average Width in the second panel. (Image by Author)

We can also use the divergence method on the width indicator as it is simply another form of the MACD oscillator.

- **Strategy 2#: The Zero Alignment**

The Zero Alignment strategy is another way of signaling when the market price equals the two moving averages. Depending on the previous position of the price, we can say that we are looking at a possible support or resistance level.

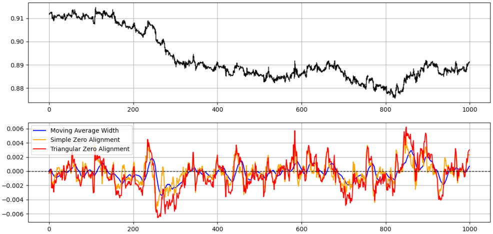


The width in blue, the EURUSD minus the first moving average in orange, and the EURUSD minus the triangular moving average. (Image by Author)

The Zero Alignment is composed of the width which is the difference between the two moving averages, and two price lines where one is the market price minus the first moving average and the other is the market price minus the Triangular Moving Average. When they all converge to zero, it simply means that the two moving average are at the same zone and are providing a double support or resistance level, similarly, the price lines around zero signify that the market price is at the moving average zone.

The idea and trading conditions are:

- **Whenever the three lines are around zero while the price lines have been positive previously, it signifies a support.**
- **Whenever the three lines are around zero while the price lines have been negative previously, it signifies a resistance.**



The width in blue, the USDCHF minus the first moving average in orange, and the USDCHF minus the triangular moving average. (Image by Author)

- **Strategy 3#: The Slope Technique**

The steepness of two or more points is measured by the slope. A greater slope means a steeper line while a lower slope means a flatter line. We can measure the slope in geometry by using a simple formula. Basically, the slope can be found by measuring the *ratio of the vertical change to the horizontal change.*

Now, to calculate steepness (or the slope), we can use the function in the below code snippet:

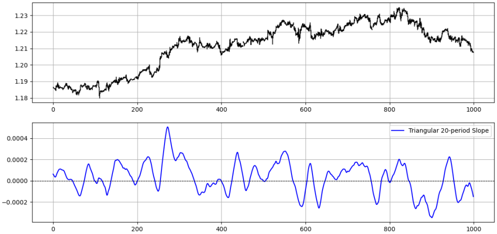
```
def steepness_indicator(Data, lookback, steepness_period, what,
where):

    # Calculating a Simple Moving Average
    Data = ma(Data, lookback, what, where)
```

```
    # Calculating the Slope (Differences of Moving Averages)
    for i in range(len(Data)):
        Data[i, where + 1] = (Data[i, where] - Data[i - 
steepness_period, where]) / (i - (i - steepness_period))


    return Data
```

What the above function does is simply calculate a simple moving average, then loops around the totality of the data array and subtracts the current moving average by the one preceding it by a variable amount of time that we wish to specify using the **steepness_period** input, and finally dividing by the time interval which is the same as the steepness_period. The **where** variable is where you want to output the indicator. The **what** variable should refer to the closing price as it is the variable that we calculate the moving average on.



EURUSD in the first panel with the Triangular Slope in the second panel. (Image by Author)

The trading conditions on a moving average slope are as follow:

- **Go long (Buy) whenever the slope surpasses zero while the previous two slopes are below zero. Hold this position until getting a contrarian signal.**
- **Go short (Sell) whenever the slop breaks zero while the previous two slopes are above zero. Hold this position until getting a contrarian signal.**

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Conclusion

Why was this article written? It is certainly not a spoon-feeding method or the way to a profitable strategy. If you follow my articles, you will notice that I place more emphasize on **how to do it** instead of **here it is** and that I also provide functions not full replicable code. In the financial industry, you should combine the pieces yourself from other exogenous information and data, only then, will you master the art of research and trading.

I always advise you to do the proper back-tests and understand any risks relating to trading. For example, the above results are not very indicative as the spread we have used is very competitive and may be considered hard to constantly obtain in the retail trading world (but not impossible). However, with institutional bid/ask spreads, it may be possible to lower the costs such as that a systematic medium-frequency strategy starts being very profitable.

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When Simplicity Performs Better Than Complexity. A Python Study.

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Combinations of indicators is the first step towards a better trading system. The nonlinearity of the financial markets makes it unlikely that only one indicator can predict the markets most of the time. It is always fun and useful to know which combinations work and which do not. In this article, we will see a combination of two famous technical indicators an back-test their strategy.

If you want to see more combinations, feel free to read the below article as well:

The K's Momentum Indicator. A Powerful Contrarian Trading Strategy.
Introducing the K's Momentum Indicator and Back-testing its Strength.
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The Stochastic Oscillator

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Trending or Ranging Market? Using The Vertical Horizontal Filter in Trading.

Detecting Market Regime Changes in Python.

www.newtrading.fr

A huge chunk of the time spent trading is spent searching for the the answer to this famous question: "*What will the market do next? Range? Trend*?". The answer to this question is a form of holy grail because if we know what will happen then we will be able to choose the right strategy.

Many good strategies fail at some point because the market regime has switched and is no longer representative. Imagine a hypothetical scenario where we know the market will continue to move sideways. …

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Jan 14 ★

Developing a Fractal Pattern Recognition Algorithm.

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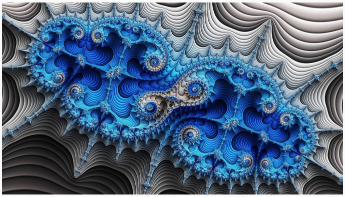

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Pattern recognition is the search and identification of recurring patterns with approximately similar outcomes. This means that when we manage to find a pattern, we have an expected outcome that we want to see and act on through our trading. For example, a double top/bottom pattern is a classic technical pattern that signals an imminent trend reversal. The literature differs on the predictive ability of this famous configuration. In this article, we will discuss an objective pattern that can help find breakouts as opposed to reversals. …

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A Substitute for Fibonacci in Trading. Thinking Outside the Box.

Presenting the Lucas Series as a Complement to Trading.

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The most famous sequence in Mathematics is without a doubt the Fibonacci sequence. It is used in Technical Analysis as a way to find support and resistance levels. It can have other uses as well such as pattern recognition and moving averages. In this article, we will discuss a similar sequence to Fibonacci and then use it in trading in order to find support and resistance levels.

If you are interested in knowing how to use the Fibonacci sequence in pattern recognition trading, feel free to have a look at this article:

Combining Timing and Patterns to Form Trading Strategies.

Developing a Market Timing Pattern for Financial Trading.

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The Lucas Series

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Published in **The Startup** · Jan 10 ★

The Oscillator of Moving Average, Coding and Using It in Trading.

What is the Oscillator of Moving Average? And How to Use it?

www.wallsheaven.com

An Oscillator of Moving Average is an interesting transformation that can be used as confirmation in trading. It is very versatile and can be used with the majority of technical indicators. In this article, we will apply the Oscillator of Moving Average transformation on two known indicators and then see how it should be used properly.

If you are interested by contrarian strategies, be sure to check out the below article I have recently published:

The K's Momentum Indicator. A Powerful Contrarian Trading Strategy.

Introducing the K's Momentum Indicator and Back-testing its Strength.

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