

Indicators; The Basics

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Introduction

Having a trading system by combining indicators is a great way to trade. Rarely should a trader use only one indicator to trade. Combining indicators gives a trader more confidence that a signal is working. However, before you can achieve combining, you must understand the basics, one indicator at a time.

I'll be giving three classes on indicators over the next several weeks. By the time you're done with all the classes you'll have the concept and the knowledge to combine indicators confidently. Furthermore, you'll be able to trade them.

Today's class covers the basics. We'll look at 3 concepts and the indicators that go with them. The next class will combine several indicators that you can use in a trading system. The last class will cover...well...um...I don't really know yet. I haven't decided. I'll be sure to let you know though.

Categorizing Indicators by Trend and Direction

Trend

Let's start with a question. Is the market trending up or down and in what time frame? You can't know the trend without a time frame. Are you using a 5-minute chart? 15, 30, Daily? The market can be in a downtrend on the daily and an uptrend on the 5-min.

Know what time frame you are trading. Switching between time frames, say, from a 5-min chart to a 15-minute chart is asking for trouble. Personally, I like to know the Daily trend, however, the 30-min and 5-min trend concerns me the most. I'll use the 30 minute to define my 'long-term trend' and the 5-min for my short-term trend. However, I'm getting ahead of myself. Let's get back to basics.

Two trend indicators

1. MACD
 - a. Moving Average Convergence Divergence
2. DMA
 - a. Displaced Moving Averages

MACD

Moving Average Convergence Divergence

MACD is a trend indicator. It can be used as momentum indicator also; however I don't use it for that. We'll be concentrating on the MA part of the MACD. (See the end of this paper for other ways to use the MACD).



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[Note the 20, 40, and 10. Most analytical systems default to 12,26,9. On short term charts I prefer 20, 40, and 10]

Let's go over the components of the MACD using the chart above, concentrating only on the MAs.

- MACD shows the relationship between two moving averages or in this case two Exponential Moving Averages (EMAs)
- Note the two wavy lines. The thin line is an average of two EMAs
 - the formula for this line deals with the input numbers 20 and 40.
 - subtract the higher value from the lower value
 - $40 \text{ bar EMA} - 20 \text{ bar EMA} = \text{macd}(20,40)$
 - This line will always be the smoothest line if the 3rd number ((sig(10)) used in the chart is lower than the two macd numbers, in this case 20,40. This is the case most of the time.
- The **thicker** line is signal line. Denoted by, sig(10)
- An EMA is a version of a Moving Average It's just a different math formula which I won't go into here.

- EMAs
 - simply an average of prices over an amount of bars/time.
 - you could use MAs instead of EMAs in a macd if you wanted too
- The Signal line
 - the thick line, sig(10), will weave its way above or below the thin line macd (20,40)
- The MACD trading signal
 - when the *signal line* crosses the *macd (20,40)* line the trend has changed
 - if the *signal line* is over the *macd (20,40)*, the trend is up
 - if the *signal line* is under the *macd (20,40)*, the trend is down.
- {Note: I don't use the MACD as indicator by itself. I combine it with others.}

DMA

Displaced Moving Averages

Type of indicator: Trend



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A DMA is simply a moving average (MA) pushed forward by X periods. Note the DMA lines are ahead of the bar price. That's because I told the software to displace the MA by 5 periods, hence the term DMA (Displaced Moving Average).

When you set up a MA in a chart there are a couple of boxes you can fill in. The first box would be the 'period' box. The software is asking, "How many periods do you want to look back?" Said differently, "How many bars do you want to look back?"

An MA is an average price of X amount of bars. So looking at the chart above, there are two MAs. One is a 25-bar MA and the other is a 7-bar MA. (The 7-bar is lower than the 25-bar, on this chart.) I've asked the software to give me an average price of ZN over 7-bars and 25-bars, then, draw a line showing me those averages.

The displaced part comes from another box that you can elect to fill in when you are building the MA. There should be a box that says 'displace'. I elected to displace the MAs 5 bars (or periods) forward.

The signal for this indicator comes when there is a crossover or under of the two lines. In the chart above, the 25-bar ma is over the 7-bar ma. This is a trend signal showing that the market is in a downtrend. If the 7-bar ma crossed the 25-bar ma, then, we'd have an up-trending market.

Lastly, note that the two DMA indicators are also known 25x5 and 7x5. Meaning that the 7x5 is a 7-bar moving average displaced 5 time periods into the future.

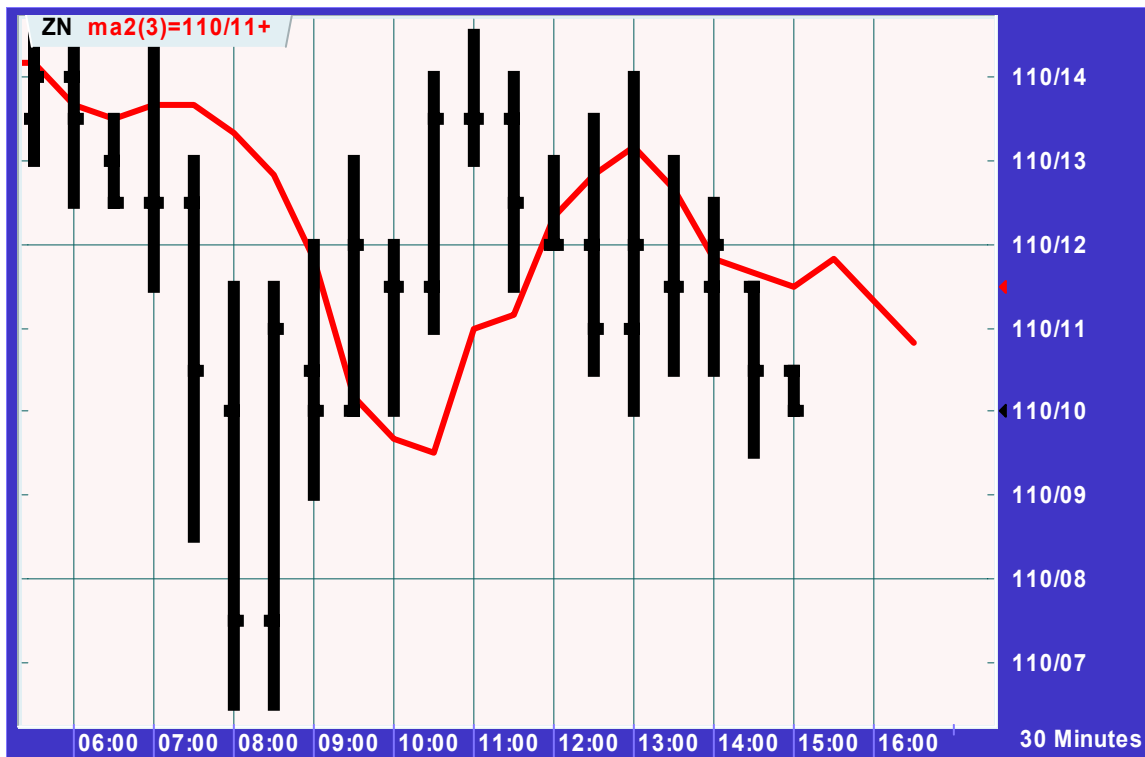
Direction

Rule: Direction overrules Trend. If there is a conflict between a directional indicator and a trend indicator, the directional indicator wins. Follow that indicator.

3x3 MA

3-Bar Displaced Moving Average used as a Directional Indicator

This is a type of moving average that can be used as a directional indicator.



The chart above has a 3x3 DMA laid over the price. Note the DMA is ahead of the bar price. Using the information from the section we just covered, we know that the 3x3 is a 3 bar moving average displaced 3 time periods into the future. The 3x3 can be used as a directional indicator; however, I never use it on anything less than a 30 minute time frame.

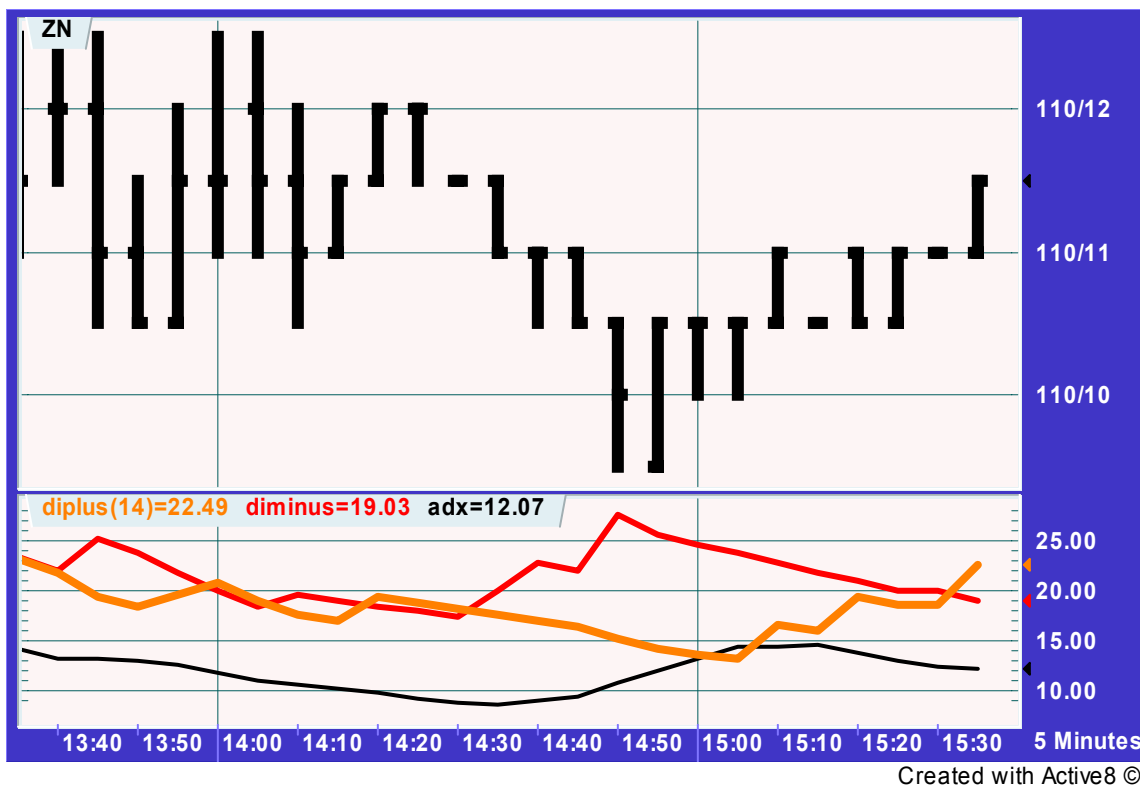
Something important to remember, when trading DMAs, is that since they're placed into the future, if you are going back and looking at data to see if the DMA was working or not, you must take into account the displacement. For example, in the chart above if you look at the price bar at 13:00 (the outside bar) and you want to know what direction the DMA was in on that bar, you must count ahead 3 bars. If you look over the 14:30 bar you'll see where the DMA was for the 13:00 bar. It was in the down direction.

The DMI

The DMI stands for *Directional Movement Indicator*, invented by Welles Wilder. It's also known as the ADX and the ADXR.

Welles Wilder also developed the RSI oscillator (Relative Strength Index), and the ATR index (Average True Range).

The indicator is based on the concept that we oscillate in a trading range 70% of the time and trend 30% of the time.



Looking at the chart above we see 3 lines.

- 1) diplus, commonly referred to as DI+ (it's the thickest line and the highest line @ 15:30)
 - a. DI+ stands for *Directional Index Positive*
 - b. DI+ measures upside direction.
- 2) diminus, commonly referred to as DI- (it's the next thickest line and is just below the DI+ @ 15:30)
 - a. DI- stands for *Directional Index Negative*
 - b. DI- measures downside direction.
- 3)
- 4) adx, commonly referred to in capital letters as ADX (it's the thinnest line and the lowest @ 15:30)
 - a. adx stands for *Average Directional Movement index* (where x = index)
 - b. ADX measures the power of the direction

Using the chart above we can see the DI- is below the DI+ and the ADX is sloping down. This is an indication of a market direction of up, but, the ADX is telling us that the directional indicators are weak because the ADX is moving lower.

Many traders simply trade the DI+ and the DI- ignoring the ADX. Some use the ADX by itself. The ADX can be used as a trend indicator. The whole system can be used as a parabolic SAR system. I encourage you to look up parabolic SAR.

Your job is plot the DMI and to look it up on the internet or in your analytical software. See if it works as a directional indicator in your time frame. Some people use the DMI as a stand-alone trading system.

Further Reading and Notes

*Many of the concepts in this paper are taken from the writings of Joe DiNapoli. We'll delve into his work in the next class. His best book is *Trading DiNapoli Levels*.

Here are some other ways the MACD and DMA is interpreted:

[The following is from www.investopedia.com]

1. MACD

- a. A trend-following momentum indicator that shows the relationship between two moving averages of prices. The **MACD** is calculated by subtracting the 26-day exponential moving average (EMA) from the 12-day EMA. A 9-day EMA of the MACD, called the "signal line", is then plotted on top of the MACD, functioning as a trigger of buy and sell signals.
- b. *There are three common methods to interpret the MACD:*
 - 1) **Crossovers** - *When the MACD falls below the signal line it is a bearish signal, and indicates that it may be time to sell.*
 - 2) **Conversely**, *when the MACD rises above the signal line, the indicator gives a bullish signal, and indicates that it may be time to buy.*
 - 3) **Divergence** - *When the security price diverges from the MACD, it signals the end of the current trend.*
Dramatic rise - When the MACD rises dramatically - that is, the shorter moving average pulls away from the longer-term moving average - it is a signal that the security is overbought and will soon return to normal levels

2. DMA

- a. A moving average that has been adjusted forward or back in time in order to forecast trends. Displaced moving averages are constructed by taking the moving average and shifting it by a number of intervals, either positive or negative. If the number is negative, the displaced moving average will lag the original moving average, and if the number is positive the displaced moving average will lead the original moving average.

- b. *The aim behind displaced moving averages is to allow traders to center the moving average or make the displaced moving average fit better with the price movement, thereby removing some of the noise in the moving average. Some traders believe that displaced moving averages have more predictive power than basic moving averages such as simple and exponential.*

[The following is from www.chartfilter.com]

3. The Directional Movement Index (DMI)
 - a. DMI is an effective and frequently used trend indicator. This system was designed by Welles Wilder Jr. and is made up of three lines:
 - b. The +DI indicates the **up average**.
 - c. The -DI indicates the **down average**.
 - d. The ADX, average directional movement index, shows whether a trend is in effect by smoothing the difference between the +DI and -DI.
 - e. Signals
 - 1) Generally speaking, the two main buy and sell signals generated by DMI are as follows: A **buy** signal is given when +DI crosses above the -DI line.
 - 2) A **sell** signal is given when +DI crosses below the -DI line.
 - 3) However, some refinements are suggested by experienced traders: The crossing of DI lines only provides an early warning signal; other criteria must be fulfilled for the actual signal.
 - 4) The ADX should be between the upper DI line and the lower one. An ADX below 25 is a strong warning to avoid trading.
 - a. Wilder himself developed a refinement to take care of whipsawing (when the DI lines cross back and forth over a short period, providing unreliable signals). He called it his Extreme Point Rule.
 - b. The **Extreme Point Rule** is derived by noting the high or low point on the day when the +DI and the -DI cross one another. +DI determines the high or low point (if +DI is *above* -DI the Extreme Point is the high of the day, if +DI is *below* -DI, the Extreme Point is the low for the day).
 - c. The extreme point is then used for the actual buy or sell signal. For example, if the price once again rises above the Extreme Point price level you have a buy signal. If the price fails to rise above the extreme point, you should continue to stand aside. The converse holds true for sell signals.
 - d. ADXR
 - 1) An additional indicator, the *average directional movement index rating* (ADXR), was created by Wilder as a measuring tool for the strength of ADX. ADXR is the average of the current ADX

and the ADX 14 days ago. ADXR is typically plotted alongside ADX on the same chart.

2) Also see the [*Parabolic SAR*](#) indicator.

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