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Pierrefeu, Alex

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Alex Pierrefeu
Sevilla, Dos Hermanas, 41700
shaddoll07@gmail.com

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ABSTRACT

In this paper i present a new technical indicator that aim to display bands in the price chart. The bands are calculated recursively in order to make them computationally efficient. Then various calculations involving the bands will be described in order to provide alternatives of the proposed indicator.

Keywords Trading · Technical Analysis · Technical Indicator · Envelopes · Bands · Rescaling

1 Introduction

Envelopes are a type of technical indicators that display one upper band and one lower band, they are often used to determine possible support and resistance points when crossing with the market price, they can also determine the current market trend direction when using a breakout methodology where market price is said to be up-trending when crossing with the upper band and down-trending when crossing with the lower band. Most of the time, bands can be constructed from $\mu \pm k\sigma$ where μ is an estimator of the current market central tendency *(SMA, EMA,...etc)*, σ is an estimator of the market volatility and k a multiplicative factor. However it might be interesting to propose a recursive method for the computations of the bands since recursion allow for more computationally efficient indicators.

2 Calculation

The bands are calculated as follows :

$$upper_t = max(close_t, upper_{t-1}) - \alpha|close_t - upper_{t-1}|$$
$$lower_t = min(close_t, lower_{t-1}) + \alpha|close_t - lower_{t-1}|$$

where $close_t$ is the closing market price, $upper_1, lower_1 = close_1$ and α is the smoothing factor where $1 > \alpha > 0$. Most technical analysis software's use an integer $length$ as indicator parameter, therefore a potential value for α can be defined as $\alpha = \frac{2}{length+1}$. It can be seen that from figure 1 that the bands possesses inherent smoothing which is a common thing with envelopes indicators.

From the bands we can get a central tendency estimator $basis_t$ and a volatility estimator σ_t each defined as :

$$basis_t = \frac{upper_t + lower_t}{2}$$
$$\sigma_t = upper_t - lower_t$$

Figure 1: In red $upper_t$ and $lower_t$ and in orange $basis_t$ with $length = 200$

3 Rescaling Using The Proposed Indicator

Rescaling price in a certain range is a common practice in technical analysis and various indicators aim to rescale the closing price in a certain range *(RSI[2], Stochastic[3], Williams %R[4])* . It is possible to rescale the price in an approximate range of [0,1] by using the following formulas :

$$x'_t = \frac{close_t - lower_t}{upper_t - lower_t}$$

or alternatively :

$$x''_t = \frac{upper_t - close_t}{upper_t - lower_t}$$
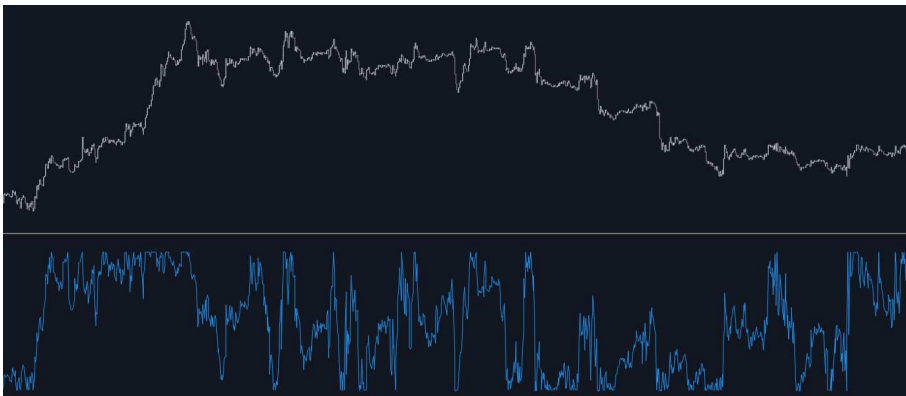
where x' and x'' are the rescaled closing price.

Figure 2: In blue x'_t with $length = 200$

4 Conclusion

I have presented a new method for calculating bands for technical analysis. The bands have also been used to rescale the price a certain range. It is possible to make the proposed indicator adaptive, the efficiency ratio *(ER)* used in the Kaufman adaptive moving average *(KAMA)* [1] can be a good candidate since it lays in a range of $[0, 1]$ and decrease when $length$ increase, therefore for the proposed indicator could replace α with :

$$\alpha'_t = ER_t = \frac{\mid close_t - close_{t-length} \mid}{\sum_{i=0}^{length} \mid \Delta close_{t-i} \mid}$$

Although the proposed indicator may not be profitable on the long run it could like the Bollinger bands indicator *(BB)* generate positive returns by using a reversal strategy [5].

References

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