Cascaded Truncated EMA

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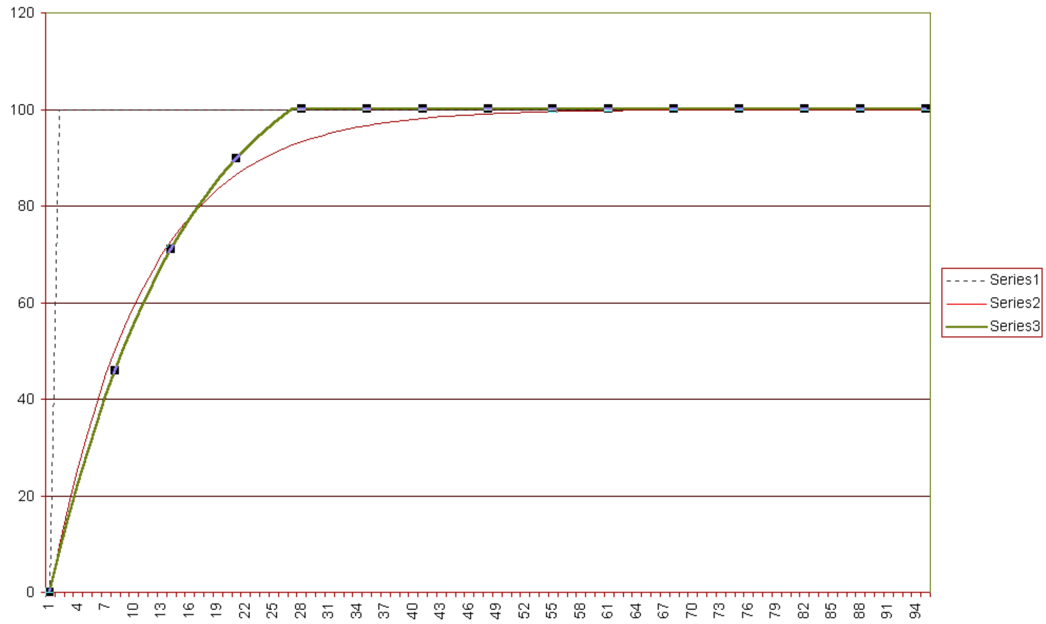
23-Oct-2004

Introduction

An interesting twist to the exponential tail problem that both the DEMA and TEMA both suffer from is that neither have a clocking delay built into their formulas before they subtract another exponential with the same decay properties as the first exponential - and this (I believe) is why they don't work!

If the original exponential is multiplied (amplified) by say 1.2 times and then a second exponential with the same decay characteristic is subtracted from the amplified signal, then (with a clinical Step input) the second exponential will cancel the tail of the first exponential, and result in a constant output from that time from a step input. This is in effect a pair of cascaded exponentials but one is delayed and truncated! A clinical example of what I mean is shown in the graph below.

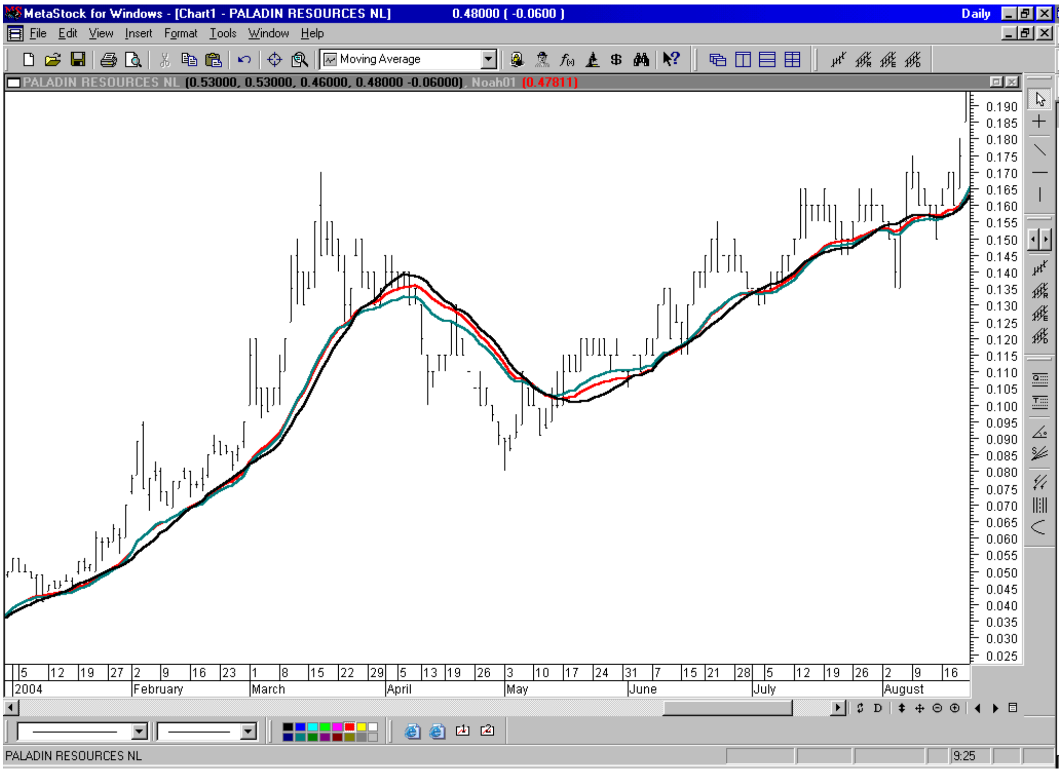


This graph has the equation:

CT_EMA01 = 100 * (1.20 * EMA29 (Z_{00}) – 0.20 * EMA29 (Z_{26}))

The Z notation refers to a digital period delay, Z_{00} means a delay of zero periods, Z_{26} means 26 periods delay. Being translated into MetaStock Equation language the statement becomes:

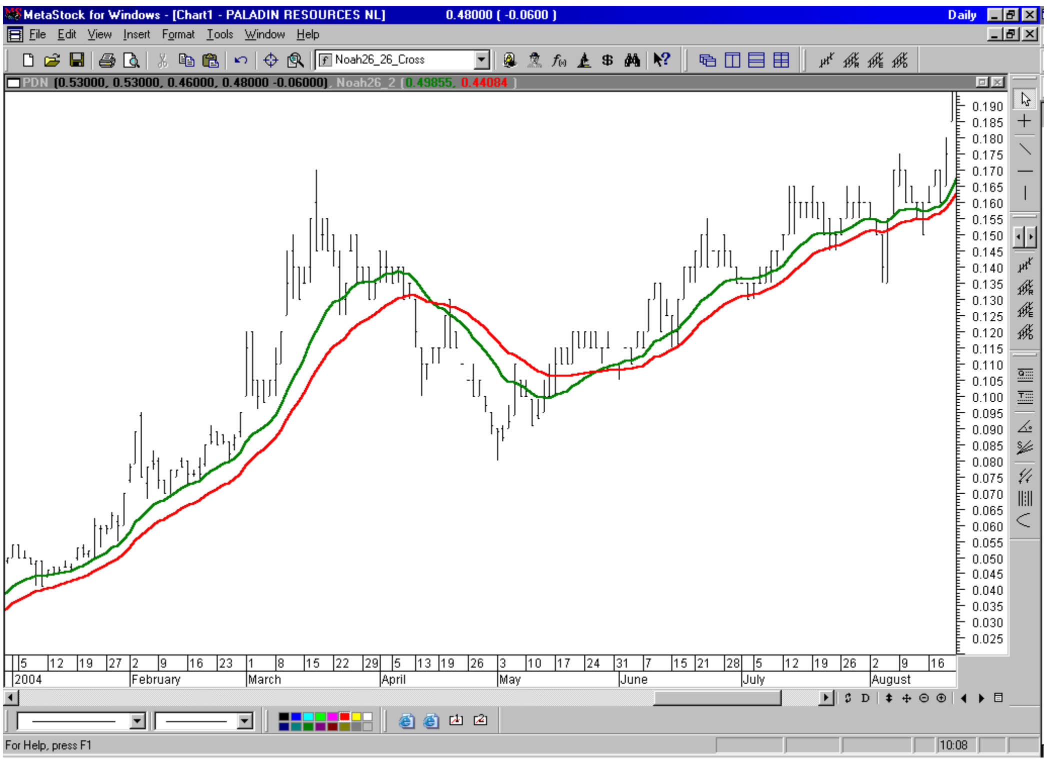
CT_EMA29 = 1.20 * mov(Close,29,E) – 0.20 * ref(mov(Close,29,E),-26)



In practice, shown in the above graph, the truncated exponential **(CT_EMA) is the RED** line sitting under the **black (SMA)** peak and above **green (EMA)** peak.

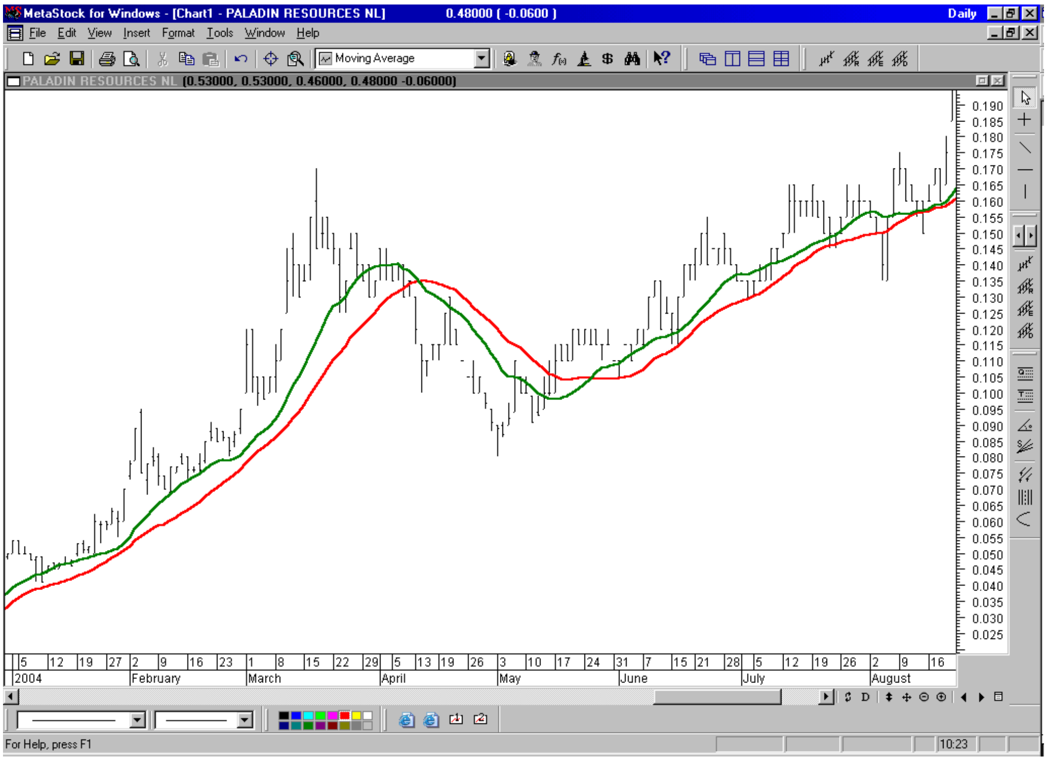
So the CT_EMA just slightly under-performs the SMA, but well outperforms the EMA and so the CT_EMA shows incredible promise!

As shown before this curve is normalised to crossover at the 80% point, so making a direct comparison with a two moving average is a little bit more tricky, as the delay factor has to be also considered.



Compared to a SMA 26 / 16 crossover: The CT_EMA 26 / 16 is shown above and the SMA 26 / 16 is shown below.

Both of these are significantly better than the DEMA and TEMA and EMA.



In normalising the CT_EMA indicator, the CT_EMA26 was (EMA38, Z34) and the CT_EMA16 was (EMA23, Z21).

It is now clear that the delay factor is far too long to be effective and therefore a general case must be developed that consists of several pairs. In a more general form this paired subtractive exponential equation would take the form of:

CT_EMA(n) = (K1a * EMA(P1) (Z1a) – K1b * EMA(P1) (Z1b-Z1a))

Naturally this family of equations can be extended to be a family of pairs of exponentials as 'piecewise linear' parts to make up virtually any risetime shape as required, based on the limit of the clocking arrangement, but the total number of negative terms in the equation must equal the total number of positive terms. In the trivial case, the coefficient of the only negative term is actually a zero!

Comments and Corrections are welcome