Trading Rule: Exponential Trading Rule - Three factor

Contents

1 Rule Description

These representations have the position dependent on an exponentially weighted average of the prior values of research and price. The lookback length, L, determines how far back the rule looks. The decay rates, ϕ_1, ϕ_2 and ϕ_3, and amplitudes, κ_1, κ_2 and κ_3 coefficients determine the contribution from each exponential. The expression is normalised to be dimensionless by division by the weighting factors and current price.

2 Rule Parameters

Below is a table summarizing the parameters specific to this trading rule.

Parameter Name	Default Value	Description	Symbol
Window size	10	This is the number of time steps over which exponential contributions are sourced.	L
Exponential decay rate for price m, m $\in \{1, 2, 3\}$	0.0	These are the decay factors that reduce older contributions from the price series.	ϕ_m^p
Exponential decay rate for research m, m $\in \{1, 2, 3\}$	0.0	These are the decay factors that reduce older contributions from the research series.	ϕ_m^r
Amplitude of price contribution m, $m \in \{1, 2, 3\}$	-0.1	These factors scale the overall contribution from past values of price.	κ_m^p
Amplitude of research contribution m, $m \in \{1, 2, 3\}$	-0.1	These factors scale the overall contribution from past values of price.	κ_m^r

3 Equation

$$\lambda^p(n,m) = \sum_{l=1}^{m} e^{-\frac{n}{e^{-\phi_l^p}}} \tag{1}$$

$$\lambda^r(n,m) = \sum_{l=1}^{m} e^{-\frac{n}{e^{-\phi_l^r}}} \tag{2}$$

$$\Lambda_{mp} = \kappa_m^p \frac{\sum_{n=0}^{L} p_{t-n} \lambda^p(n,m)}{\sum_{n=0}^{L} \lambda^p(n,m)} \tag{3}$$

$$\Lambda_{mr} = \kappa_m^r \frac{\sum_{n=0}^{L} r_{t-n} \lambda^r(n,m)}{\sum_{n=0}^{L} \lambda^r(n,m)} \tag{4}$$

$$z_t = \frac{(\Lambda_{1p} + \Lambda_{1r} + \Lambda_{2p} + \Lambda_{2r} + \Lambda_{3p} + \Lambda_{3r})}{p_t} \tag{5}$$

where p_t is the price at time t, r is the value of the research series, κ_1, κ_2 and κ_3 are the amplitude coefficients, ϕ_1, ϕ_2 and ϕ_3 are the decay rate coefficients and z is the resultant fractional portfolio investment. Intuitively, the λ are the exponential weightings for each historical value in the lookback period, with Λ the normalised sum of all the contributions, scaled by the amplitude coefficient. The total contributions are then scaled by the current price to give a dimensionless fraction of the portfolio to invest.

4 Glossary

- **Bullish:** Positive outlook on the market. Expectation of positive returns.
- **Bearish:** Negative outlook on the market, Expectation of negative returns.
- **Allocation:** The allocation is the fractional amount of the portfolios value used to determine the size of the trading position.
- **Parameter:** Value used by the trading rule in the calculation for trading position
- **Trading Rule:** Strategy to determine when to buy, hold or sell a position.

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1. InferTrade: https://www.infertrade.com
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