



# Trading Rule: Exponential Trading Rule - One factor

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# 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 rate,  $\phi$ , and amplitude,  $\kappa$ , 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    | 0.0           | This is the decay factor that reduces older contributions from the price series.    | $\phi^p$   |
| Exponential decay rate for research | 0.0           | This is the decay factor that reduces older contributions from the research series. | $\phi^r$   |
| Amplitude of price contribution     | -0.1          | This factor scales the overall contribution from past values of price.              | $\kappa^p$ |
| Amplitude of research contribution  | 0.1           | This factor scales the overall contribution from past values of research.           | $\kappa^r$ |

## 3 Equation

$$\lambda_n^p = e^{-\frac{n}{e^{-\phi^p}}} \quad (1)$$

$$\lambda_n^r = e^{-\frac{n}{e^{-\phi^r}}} \quad (2)$$

$$\Lambda_p = \kappa^p \frac{\sum_{n=0}^L p_{t-n} \lambda_n^p}{\sum_{n=0}^L \lambda_n^p} \quad (3)$$

$$\Lambda_r = \kappa^r \frac{\sum_{n=0}^L r_{t-n} \lambda_n^r}{\sum_{n=0}^L \lambda_n^r} \quad (4)$$

$$z_t = (\Lambda_p + \Lambda_r) / p_t \quad (5)$$

where  $p_t$  is the price at time  $t$ ,  $r$  is the value of the research series,  $\kappa$  are the amplitude coefficients,  $\phi$  are the decay rate coefficients and  $z$  is the resultant fractional portfolio investment.

## 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.

## Further Links

1. InferTrade: <https://www.infertrade.com>
2. Privacy Policy / Legal notice: <https://www.infertrade.com/privacy-policy>
3. InferStat Ltd: <https://www.inferstat.com>