EHLERS 2021 WORKSHOP SYLLABUS

The workshop consists of 16 one hour modules. Four modules per day will be presented via Webex the week of October 18, starting shortly after the market close.

MODULE DESCRIPTIONS

1. Introduction and Overview.
   The basic requirements of successful trading strategies right at the outset of the workshop will be established and I will give the workshop roadmap to describe how we will meet those requirements in making robust strategies. My scientific approach is compared to some aspects of conventional technical analysis. I will also review my experience so participants will be confident that I am an authority on the subject matter.
2. Cycle theory and math basics
   The physical origins of cycles are discussed. The mathematical tools necessary to handle market indicators and strategies include components of algebra, trigonometry, calculus and complex variables. The concept of Z transforms to deal with filters and strategies are introduced. Advanced math is not a prerequisite.
3. Technical description of market data
   Market data are fractal. That has broad implications regarding the spectral content, and hence, basic requirements on filter structures. Further, market data is sampled data, and therefore is subject to aliasing. Basic data structure enables the estimate of a data time constant, which has a huge impact on the requirements for Walk Forward Optimization. Data is described in terms of AM and FM modulations. AM corresponds to volatility. FM are the sole basis of timing signals.
4. Finite Impulse Response Filters
   Simple Moving Averages are part of the class of FIR filters. Basic understanding is clarified through the use of Z Transforms. Near optimum, easy to program windowing functions are developed, including Triangle, Hamming, and Hann windows. The extreme importance of filter phase response will be underscored.
5. Infinite Impulse Response Filters
   IIR Filters are described with reference to the Transfer Function. Several filters are developed, including my SuperSmoother, enhanced EMA, and High Pass filters. How to perform IIR truncation is a topic that arose from the development of Walk Forward Optimizers. Both Group and Phase delays will be described.
6. Smoothing Filters
   Special smoothing filters like my SuperSmoother, Decycler, and Filt11 zero lag filter are developed. Gaussian and Chebyshev filters are described, with code. A host of adaptive techniques are explained and coded.
7. Bandpass and Passband Filters
   Narrow Band and wide band BandPass filters are described, including my Roofing Filter. Associated topics include Automatic Gain Control (AGC) and Standard Deviation Normalization.

8. Indicators and Transforms

   The RSI and Stochastic standard indicators are improved from DSP perspective. My Reflex, Anticipate, and "Even Better Sinewave" indicators are described. A Hilbert Transform that produces real and imaginary components for market data is described. The Fisher Transform that converts market data to have a Gaussian Probability Distribution is described.

9. Spectrum Estimators

   There are three primary methods to measure market data spectra. These are MESA (Maximum Entropy Spectral Analysis), DFT (Direct Fourier Transform), and a comb filter bank of Bandpass filters. These methods are developed and compared. A new method of computing the dominant cycle using the Hilbert transform is be disclosed, with applications of tuned indicators.

10. Swami Charts

    The purpose of the SwamiCharts heatmaps is to provide an overview of market activity. It turns out to be useful to disclose the strengths and weaknesses of various technical indicators. You will have templates to build your own SwamiCharts. SwamiCharts is the basic technology in Think Or Swim's "Thermo Mode".

11. Correlation as a technical indicator

    Pearson, Spearman, and Kendall Correlations are developed as technical indicators. Correlation can provide real and imaginary components, leading to robust phase angle indicators and trading strategies.

12. Predictions

    Technical prediction establishes the current conditions and extrapolates them into the future. Several advanced techniques, including the MESA and Voss predictors, are described to implement effective predictions

13. Trading Strategy Overview

    The purpose of the trading strategy overview is to establish expectations for the performance of algorithmic trading. Discussions include probability of failure, statistics for profit and drawdown, mathematical expectation, Optimal F, Bertrand's Ballot Theorem, Stein's Paradox, and the underlying principles of trading system parameter optimization.

14. Robust Daily Strategies

    Seven strategies for use on daily bars of data are developed. All contain new discoveries regarding performance robustness. How to recognize robust strategies using platform optimizers are be described.

15. Robust Intraday Strategies

    Intraday strategies have the additional constraint of exiting positions at the end of the trading day and opening new positions the next day. Five robust intraday trading strategies are developed.

16. Optimization and WFO

Walk Forward Optimizers (WFO) enable a trader to evaluate trading strategy performance on out-of-sample data rather than misleading insample performance. The problem is that platform WFOs simply don't work. Two daily bar and two intraday WFOs are developed. These are blazingly fast, and can be used as regular trading strategies by themselves. The WFO structure can be used as a template to develop new WFO trading strategies.

Notes:

1) All code is given in EasyLanguage.
2) All advanced indicators and trading strategies are fully disclosed, including the MESA algorithm.
3) While the technical techniques are universal, applications and examples will be presented primarily using Index Futures.