

**WALK FORWARD OPTIMIZATION**  
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I am sending you these tips about Walk Forward Optimization (WFO) because I think they will be helpful to you for your use with MESA Intraday and MESA Phasor.

I have been working with TradeStation's WFO a lot recently, and it has taken me quite a while to trust the results. It actually works pretty neat when you understand all its foibles. Because so much can go wrong, I thought for a while that the tool had bugs. One of the things that surprised me is the vast difference between insample tests and WFO tests for some strategies. The basic answer to these differences lie within the strategies themselves. If there are multiple indicators or rules comprising the strategy it is well possible that these rules interact during the walk forward test, whereas the indicators and rules are fixed across the entire data set for insample tests.

First, let's establish the way the TradeStation WFO must be used to be helpful. You can do the optimization run either with the exhaustive or genetic method. When you prepare your optimization run you must establish a name for that run. It is important that the name is absolutely unique. TradeStation does not (correctly, at least) overwrite an existing file in the WFO folder. I routinely erase files in my C:\ProgramFiles (x86)\Tradestation9.5\WFO\Data folder. It is absolutely necessary that you click Advanced Settings the very last thing you do before you click Optimize, and insert 0% of the last data to exclude during optimization. For some unknown reason, TradeStation always inserts 30% to be excluded. OK. Do the optimization run.

Now for the fun part – using the Walk Forward Optimizer with MESA Intraday. Forget about all that cluster stuff! You cannot make a good strategy out of a bad one just by testing it. First, click Setup...Optimization Settings. Uncheck the prescribed number of runs box. Set the insample bars to 1080 and the out-of-sample bars to 135. Using 15 minute bars on the index Futures, there are 27 bars per day. So 135 bars is equivalent to 5 days (one week), and 1080 bars is equivalent to 40 days (2 months). So, in a nutshell, you are using 2 months of insample data and walking forward one week at a time. All this is approximate because the data gets messed up due to half day trading, etc. Further, you need to recognize that at least the first three days of your insample data will give no trades or incorrect trades because of startup issues with the indicators. The startup issue can be substantially larger with poorly designed strategies. In my opinion, 1080 bars gives adequate opportunity for the initialization errors to be averaged out in MESA Intraday. If you get an error message during the run that you do not have enough samples for good resolution, just ignore it because that message doesn't apply to our methodology.

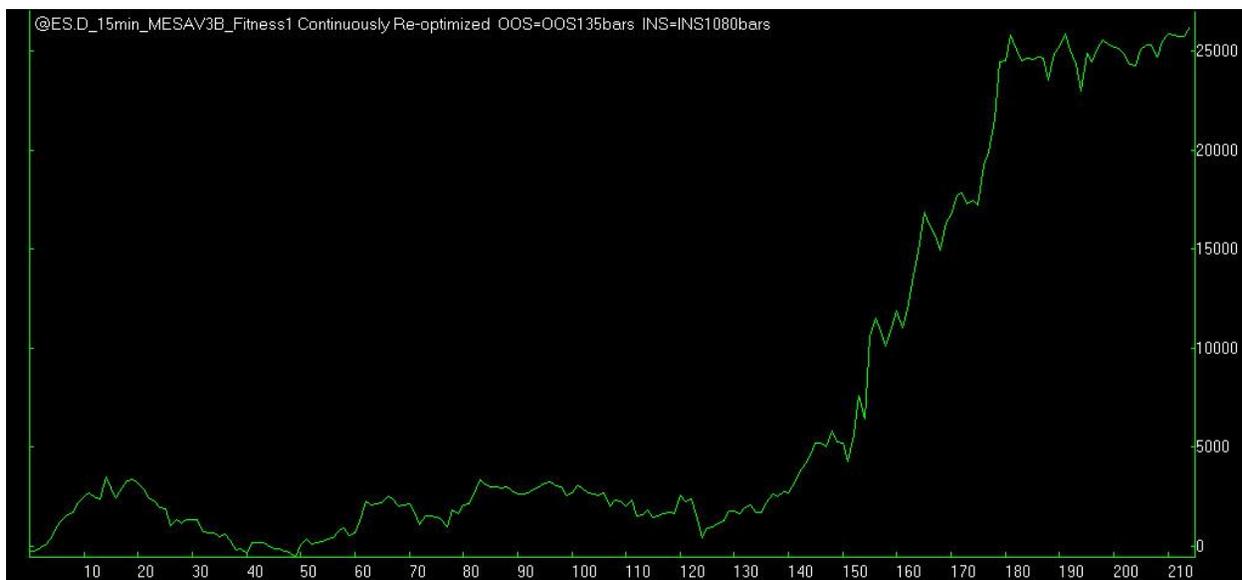
MESA Phasor only trades about 16 times a year on the average. So, in order to get an adequate insample test, you need to include a year's worth of data for the insample test.

Similarly, it is a good idea to walk forward about 3 months at a time to get a reasonable display without inadvertently terminating too many out of sample trades.

In interpreting the results, just ignore all the messages. They are basically meaningless. I think the equity chart tells you everything you want to know. Your OOS equity growth should look similar to your insample equity growth and the OOS net profit should be a healthy percentage of the insample net profit. The trading summary can be interesting. Just remember to keep your tongue in your cheek because of all the approximations and errors that are made in doing the WFO.

With respect to MESA Intraday V3B, I had a couple of surprises as a result of the WFO. First, the Risk should be optimized between \$200 and \$1500 for ES. The best setting for the Risk parameter basically makes it a Disaster Stop. Setting it lower may make you feel good, but it works against you in setting other parameters for the walk forward. The Reward parameter is basically useless. Just set it at \$100,000, which just deactivates it. I also found Long Thresh and Short Thresh adversely interacted with the other strategy parameters. It is best to set the Long Thresh at a fixed 0.3 and the Short Thresh at a fixed -0.5. These settings provide a slight upside bias for market movement.

Having done all those things, here is the Out-Of-Sample results of my walk forward test on MESA Intraday V3B from 1 January 2017 to 19 June 2018.



In summary, you should limit the range of your parameters to be optimized using the procedure described in my paper "A Procedure to Evaluate Trading Strategy Robustness". Then, perform the backtest ensuring that there is 0% of the last data to be excluded. Ensure that your WFO file name is absolutely unique. Forget the cluster stuff in the Walk

Forward optimizer, and set your insample and out of sample bars for a single walk forward test. I think your trading will be greatly enhanced by the proper use of this tool.

WFO will be one of the topics during my October 12-14 workshop. Please sign up, or tell a friend about the workshop if you think he could benefit. Here is a link for more information: <http://www.mesasoftware.com/workshop.htm>.