



V-Thrusts v.2

Investment Strategy Testing Summary

The V-Thrusts v.2 strategy is a swing trading technique based on Jeff Cooper's classic V-Thrusts. In its long version, it combines **a Donchian channel-based trend filter** with **an impulse to a new multi-week high**, followed by **a multi-session correction of significant amplitude** (a decline from the peak by several times **the ATR; Average True Range**). After such a correction, a position is opened with **a buy stop** tick above the previous day's high. Risk is defined by a fixed stop below **the correction's lows**, and the position is closed **after several sessions** (time-exit) or when **the price reaches the high formed before the correction began**. The strategy has a mirror variant for short selling.

Compared to V-Thrusts v.1, this strategy has **removed the requirement for a Reversal Day pattern** to end a correction, which is intended to improve the number of test trades received. **A take profit has also been added, set at the level of the high formed before the correction began** (or the bottom for a short position).

While the strategy's logic seems sound, it has failed even preliminary testing, as its results do not indicate a market advantage. Therefore, it is not recommended for use in real-world trading.

Our goal is to have a strategy that remains **profitable and effective across a wide range of parameters**, because the market is a volatile organism, and optimal parameters can change over time. I can't emphasize enough that for a strategy to work in real-world conditions, it must also perform under suboptimal parameters and conditions. In short, **it must be stable** to changing market conditions.

I don't know who said these words, but they perfectly capture the problem of many optimizations:

"I've never seen a strategy that didn't work in backtests."

We don't know the future, we don't know future market conditions, but if we know that our strategy **has historically generated acceptable results** in various market conditions and across various parameter ranges, then we are **one step ahead of other** market participants.



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Step 1: Formulate an investment strategy

V-Thrusts v.2 strategy joins **the ongoing trend** after a strong price impulse and **a deep, short-term correction**. **The trend context** is confirmed by the price's position within **the upper band of the Donchian channel** (for longs) and the establishment of **a new multi-week high**. The market then performs **a multi-session correction** with a range several times **the ATR (Average True Range)** calculated from the high to the low of this sequence. We enter **with a buy stop order 1 tick** above the previous day's high, and set **a stop loss at the low of the entire correction**. We close the position **several sessions** after entry, unless a stop or take profit triggered earlier. **Profit is realized when the price reaches the high formed before the correction began**.

short version is analogous: downtrend (lower Donchian band), **new multi-week low**, several times **ATR** upward correction lasting several sessions, sell stop 1 tick below the last day's low, stop above the correction high, time-exit several sessions or take profit.

The strategy uses:

- **Trend filter (Donchian channel)** – price in the upper (long) or lower (short) band of the channel;
- **Momentum Impulse** – new multi-week high/low;
- **“V” correction** – a correction lasting several sessions with a total range of several times the ATR relative to the high/low;
- **Trigger T+1** – buy/sell stop 1 tick above/below the high/low of the reversal day;
- **Constant risk management** – stop loss at the extreme of the entire correction;
- **Take profit** – when the price returns to new highs (for a long position) or lows (for a short position) it means closing the position.
- **Timed exit** – closing a position after several sessions.

Characteristics of the strategy and its strengths and weaknesses:

- **Minimalistic, easy to program** – a few simple rules ensure transparency and low computational costs;
- **Natural mean-reversion environment** – large instruments often rebound after a sharp decline within a trend;
- **Entry after a confirmed reversal following a significant correction** – often a favorable reward/risk ratio;
- **Fewer transactions in sideways trends** – in the absence of clear multi-day extremes, the system remains out of position for a long time;
- **High correction amplitude increases nominal stop distances** – strict control of position size is necessary.

V-Thrusts v.2 strategy, while simple, provides **a solid foundation for building algorithmic portfolios**. However, it requires **discipline and strict adherence to risk management methods**.



Step 2: Determine investment principles

Below is the pseudocode for the **V-Thrusts v.2 strategy** on daily data:

1. Calculating Indicators:

- a. **XXX-Donchian** – Donchian channel with XXX session window.
- b. **ATR(40)** – Average True Range over 40 sessions, used to measure correction amplitude.
- c. **Y-DayLowestLow** – the lowest price from the last Y sessions (including the current one).
- d. **Y-DayHighestHigh** – the highest price from the last Y sessions (including the current one).

2. Generating Entry Signals – Long Position:

- a. **Trend:** Y days ago the maximum price of the instrument formed a XXX-day high (XXX-day Donchian channel).
- b. **Correction:** This high was followed by a downward correction, the low of which is the lowest price of the last Y sessions (Y-DayLowestLow), and its amplitude is at least $Z \times \text{ATR}(40)$ (where Z is the ATR multiplier).
- c. **Entry:** Set a buy stop order 1 tick above yesterday's high; the order is only active for the next session.

3. Generating Entry Signals – Short Position:

- a. **Trend:** Y days ago the minimum price of the instrument formed a XXX-day low (XXX-day Donchian channel).
- b. **Correction:** After this bottom, there was an upward correction whose high is the highest price in the last Y sessions (Y-DayHighestHigh) and its amplitude is at least $Z \times \text{ATR}(40)$ (where Z is the ATR multiplier).
- c. **Entry:** Set a sell stop order 1 tick below yesterday's candle low; the order is active only in the next session.

4. Stop Loss Management:

- a. **Long position:** stop loss set 1 tick below the low of yesterday's candle;
- b. **Short position:** set stop loss 1 tick above the high of yesterday's candle;

5. Generating Output Signals:

- a. **Timed exit:** if the stop loss has not been activated earlier, close the position after the WW sessions from the entry date (closing the position at the opening price of the next day after the WW session has expired).
- b. **Take Profit:** Take profits when price returns to the pre-correction high/bottom (XXX-day Donchian channel).

6. Daily Monitoring:

- a. Each day, calculate the values: XXX-Donchian, ATR(40), Y-DayLowestLow, and Y-DayHighestHigh.
- b. The system verifies entry/exit conditions and sets appropriate buy stop/sell stop orders for the following day; keeps a day counter to the WW session for active positions.

The above rules are described in a way that allows them to be directly converted into a script in the chosen testing platform, which ensures the accuracy of the historical simulation and the reliability of the test results.



Tests are performed assuming that the risk of one position is **1.0% of total capital**.



Step 3: Pre-test your investment strategy

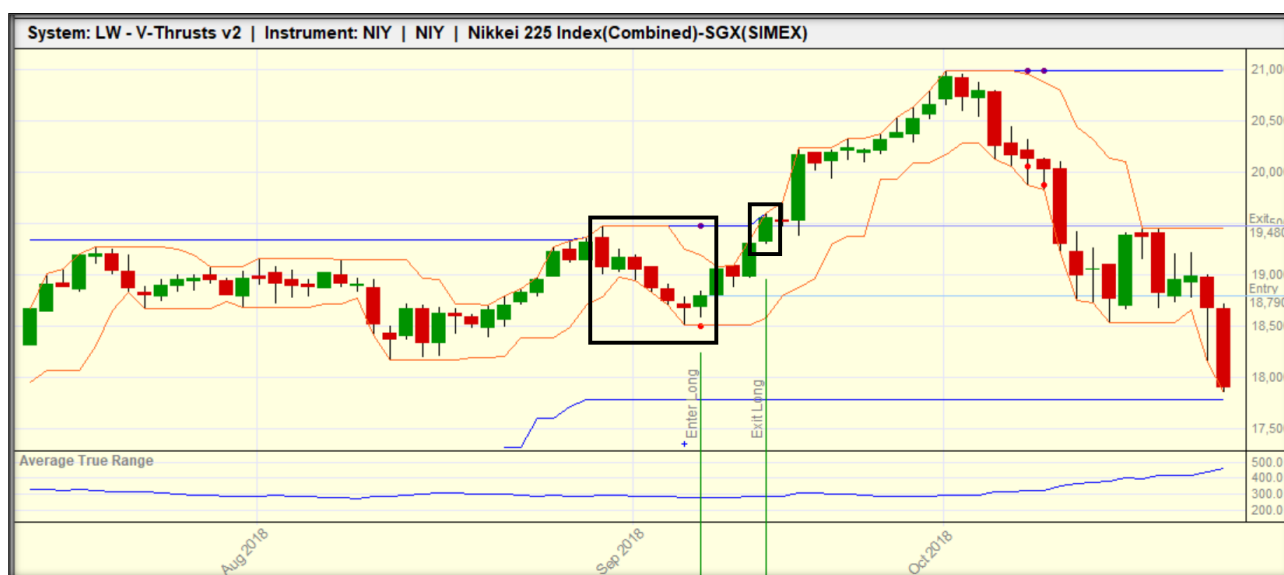
Below are some purchase and sale transactions that allow you to verify the following aspects:

- **Correctness of generated signals;**
- **Direction of opening a position;**
- **Moment of opening the position;**
- **The opening price of the position;**
- **Moment of closing the position;**
- **Closing price of the position;**
- **Compliance of the transaction with the theoretical assumptions of the investment strategy.**

At this stage, **it doesn't matter** whether the trades are **profitable**, what **instrument was used**, or whether they occurred **recently** or **in the distant past**. The key is **to verify that the trades are generated correctly** and in line with the assumptions described in the previous step.

The first transaction was conducted on a futures contract for the Nikkei 225 index. At the end of August 2018, prices formed a **new 100-day high** (the first candle in the left-hand rectangle), after which prices entered a multi-day correction. **For a buy signal to be generated**, the minimum correction must be a 5-day low (orange line on the chart) and must be within 3x the ATR (the ATR value is shown below the price chart). **These conditions were met five days after the formation of a new 100-day high** (the sixth candle in the left-hand rectangle), which generated a signal to open a long position. The next day, we placed a buy stop order one tick above yesterday's high and a stop loss order one tick below that candle's low. **The position was opened the following day** (the seventh candle in the left-hand rectangle). **The take profit was set at the high preceding the correction** (the blue dot on the chart). **The system worked correctly.**

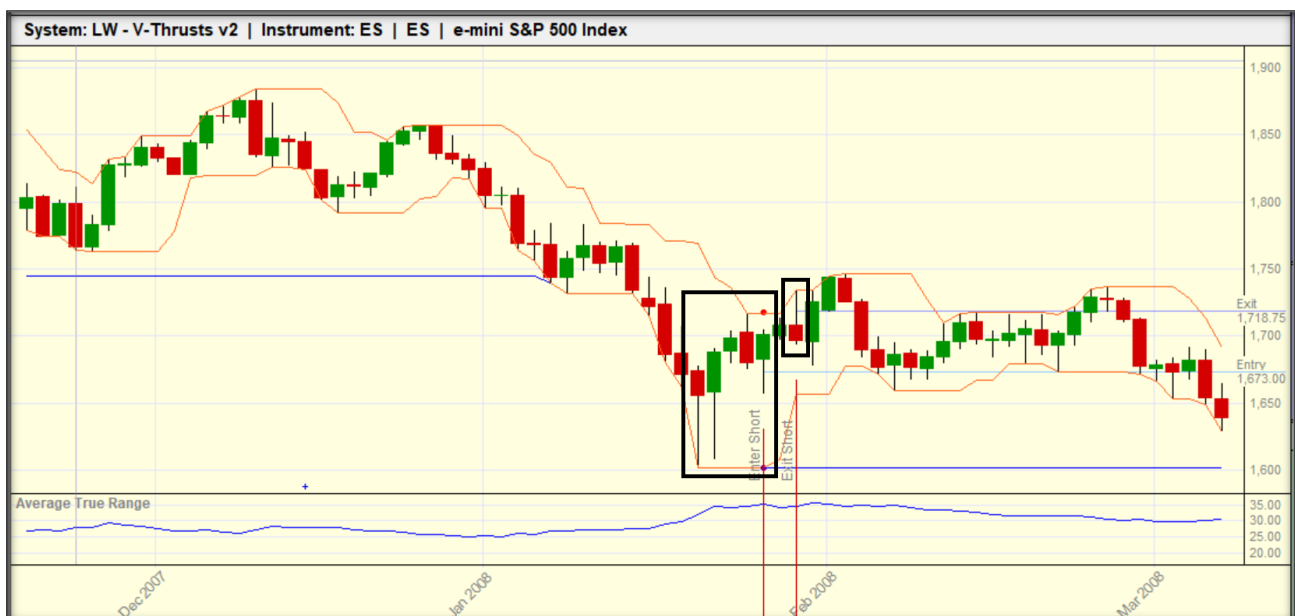
The strategy assumes **closing the position after 5 days**, either when a defensive order is triggered or when **a take profit order is executed**. In the example above, on the fifth day, the price reached the take profit level and the position was closed. **The system worked correctly.**





The second transaction was executed on an S&P 500 index futures contract (e-mini). At the end of January 2008, prices formed a new 100-day low (the first candle in the left-hand rectangle), after which prices entered a multi-day correction. For a sell signal to be generated, the correction's maximum must be a five-day high (orange line on the chart) and must have a range of 3 x ATR (the ATR value is shown below the price chart). These conditions were met three days after the formation of a new 100-day low (the fourth candle in the left-hand rectangle), which generated a signal to open a short position. The following day, we placed a sell stop order one tick below the previous day's low and a stop loss order one tick above the previous day's high. The position was opened the following day (the fifth candle in the left-hand rectangle). The take profit was set for the day preceding the correction (the blue dot on the chart). The system worked properly.

The strategy assumes closing the position after 5 days, either when a defense order is activated or when a take profit order is executed. On the third day after opening the position, the defense order was activated (the candle in the right-hand rectangle). The system worked correctly.



Once we are sure that the trades are generated correctly, we can move on to the first test of the strategy on the full in-sample dataset. These tests are conducted on baseline parameters that, in my opinion, should align with the strategy's stated goals.

First, we reject strategies that linearly lose capital. If a strategy exhibits this pattern, it's a clear signal that any parameter optimization is pointless.

Our basic expectation is that the strategy generates positive results, even if they are at a low level.

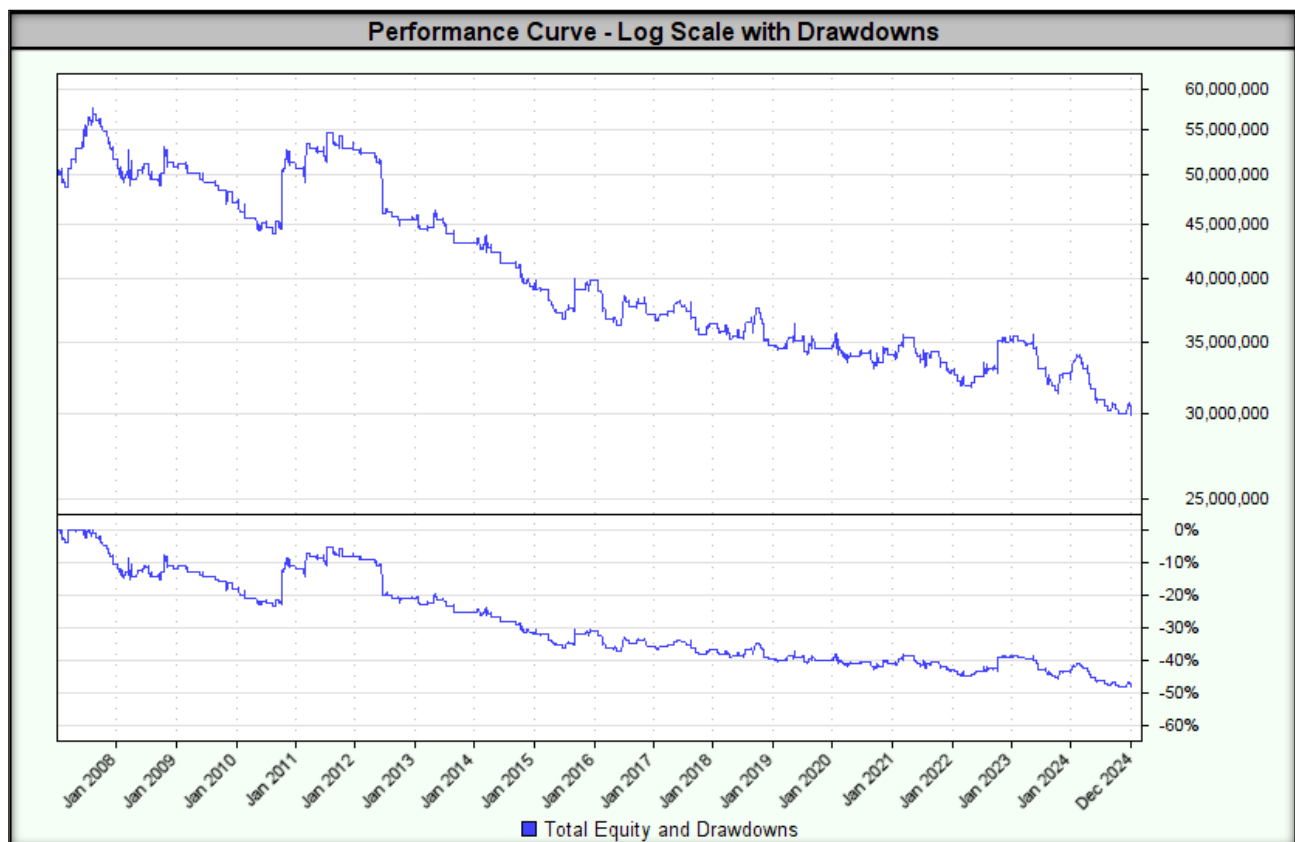
Tested base parameters:

- **Donchian Canal:** 100 days;
- **Y-DayLowestLow/Y-DayHighestHigh:** lowest/highest price of the last 5 sessions;
- **Correction range:** 3 x ATR(40);
- **Position opening method:** buy/sell stop one tick above/below the high/low of the previous day's candle (for long/short position respectively);



- **Order validity:** the order remains active only during the next session;
- **Stop loss:** one tick below/above the low/high of the previous day's candle (for long/short position respectively);
- **Take profit:** profit is realized when the price reaches the top/bottom formed before the correction began (for a long/short position, respectively);
- **Closing the position:** 5 days after opening (6 days for opening);
- **Position direction:** long and short;
- **Position sizes:** corresponding to a risk of 1.0% of total capital.

The test result is shown below.



Indicators/Measures	Concluding a transaction at the opening price
CAGR%	-2.82%
MAR Ratio	-0.06
RAR%	-3.18%
R-Cubed	-0.08
Robust Sharpe Ratio	-0.42
Max Drawdown	48.1%
Wins	41.8%
Losses	58.2%
Average Win%	1.11%
Average Loss%	0.97%
Win/Loss Ratio	1.15



Average Trade Duration (days)	5
Percent Profit Factor	0.83
SQN	-0.42
Number of transactions	479

In summary, the system worked properly and generated signals as expected. **However, the strategy has been losing capital linearly and has been in drawdown for over a decade. This means that the reliability of this strategy leaves much to be desired, and at this stage we are ending testing and abandoning further development of the strategy.**



Step 4: Optimizing and assessing the stability of the investment strategy

This stage of strategy development and testing is crucial because it determines how **effective** the strategy will be in **real-world conditions**. I cannot emphasize enough that for a strategy to work in real-world conditions, it must also perform under suboptimal parameters and conditions. In short, **it must be stable** to changing market conditions.

I don't know who said these words, but they perfectly capture the problem of many optimizations:

"I've never seen a strategy that didn't work in backtests."

My goal is not to find optimal parameter values – my goal is to find a wide range of parameters for which the strategy will generate acceptable results. We don't know the future, we don't know future market conditions, but if we know that our strategy **has historically generated acceptable results** in various market conditions and across various parameter ranges, then we are **one step ahead of other** market participants.

What **parameters to choose** for the next period is the topic of consideration in **Step 5, "Walk-Forward Analysis"**, but before we get to that, **we need to know** whether our strategy is even **stable**.

1. Stability across a wide range of optimized parameters

The step was skipped due to failure of the preliminary tests.

2. Monte Carlo simulation

The step was skipped due to failure of the preliminary tests.

3. Stability over a moving time window

The step was skipped due to failure of the preliminary tests.

4. Long/short stability

The step was skipped due to failure of the preliminary tests.

5. Stability in the portfolio of financial instruments

The step was skipped due to failure of the preliminary tests.

6. Money Management (Position Sizing)

The step was skipped due to failure of the preliminary tests.

7. Strategy Risk Management

The step was skipped due to failure of the preliminary tests.



Step 5: Walk-Forward Analysis

Walk-Forward Analysis (WFA) is a key tool for assessing a **strategy's ability to perform in real-world market conditions**. It provides **reliable measures of reward and risk** after the optimization process and allows you to answer several key questions:

1. **What rate of return can you expect from the strategy?**
 - The optimization result often overestimates the expected rate of return, which can lead to unrealistic forecasts.
 - WFA provides more **reliable and realistic measures of return** by minimizing the impact of overfitting to historical data.
2. **What set of parameters should be used in the next period?**
 - Thanks to **WFA**, it is possible **to dynamically adjust the strategy parameters to the latest market changes**, increasing its adaptability.

WFA tests the strategy over multiple time periods, minimizing the risk of overfitting (overfitting the strategy to historical data). The WFA process consists of **two repeated steps**:

1. **Optimization (In-Sample):**
 - The strategy is optimized over a specific **training period (in-sample)**.
 - This step adjusts the parameters to obtain **the best results**.
2. **Testing (Out-of-Sample):**
 - The strategy, using **the parameters optimized in step 1**, is tested on a **test period (out-of-sample)**.
 - This stage verifies the effectiveness of the strategy in new market conditions that **were not used** during optimization.

Walk-Forward Efficiency (WFE) is a key metric that assesses a strategy's potential to perform under real-world market conditions. WFE compares:

- **The rate of return achieved in the in-sample window** (where parameters were optimized)
- **Rate of return in the out-of-sample window** (where the strategy was running on unknown data)

Similarly, **for the drawdown value**, WFE checks whether the strategy does not lose significant stability outside the optimization period.

A strategy considered **stable (robust)** should meet the following conditions:

- **WFE $\geq$ 50% for the rate of return** – means that the strategy retains at least half of its effectiveness beyond the optimization period.
- **WFE $\leq$ 150% for drawdown** – means that the drawdown outside the optimization period is not significantly higher than during the optimization period.

The step was skipped due to failure of the preliminary tests.



Step 6: Using the strategy in real time

After **extensive testing**, implementing a **real-time** trading strategy becomes **relatively simple**. **Buy/sell signals and stop loss orders are generated automatically** by the computer based on pre-established rules and formulas.

The most important element **of strategy execution** is **consistent execution of all signals, without exception**. **As Larry Williams noted:** *"Trading strategies work. Traders do not."*

Before making a **final decision to implement a strategy**, it's important to verify **whether it actually adds value** to the overall portfolio performance. It doesn't make sense to implement a strategy that **generates similar signals or has a similar equity curve**.

Key criteria for evaluating strategies before implementation:

1. **Daily return correlation**
 - The **lower the correlation** with other strategies, the better.
 - **Optimal values:** Correlation close to zero or negative.
2. **Reducing maximum drawdown**
 - If adding a strategy to a portfolio results in a **lower maximum drawdown**, this is a **strong positive signal**.
3. **Objective Function Improvement (MAR)**
 - If adding a strategy causes **the MAR to increase**, this indicates that it **has added value** to the portfolio.
4. **Better results in Monte Carlo simulation**
 - Monte Carlo simulation determines the potential **maximum drawdown**.
 - If Monte Carlo results **improve** after adding a strategy, this is a **strong positive signal**.

The above elements are often interrelated – usually **all or none of them are met**.

Once you decide to add a strategy to your portfolio, **the question arises:** *Should you implement the strategy immediately or is it better to wait?*

Some studies suggest **an incubation period of 3-6 months**, during which:

- The strategy is **monitored** but **does not execute real transactions**.
- **Generated signals, positions and results** are observed to detect **potential anomalies**.

In our case, **the incubation period** lasts from the moment **the strategy is launched in a live environment** until **a drawdown occurs at approximately half the maximum drawdown** observed in historical data. **Only after this threshold is reached does the strategy begin to be used with real funds.**

Thanks to this:

- **We avoid investing real money in an untested environment.**
- **We wait for a drawdown to occur** before launching the strategy, which **reduces the risk of starting at an unfavorable moment**.



The final decision on its full implementation should be based on **thorough testing and analysis of the value added to the portfolio**, so that the strategy actually supports long-term investment goals and does not increase unnecessary risk.