PSEDYS | TECHNICAL REFERENCE MANUAL V3.0

Vortex Indicator — Technical Reference Manual v1.0

PSEDYS | Complete Edition

VM+ · VM- · TR · Rolling Sum · VI+ · VI- · Crossover · Spread · Vortex vs ADX · Ghost Effect · MTF · Bot vs TradingView

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1. What is the Vortex Indicator? Concept and Origin

The Vortex Indicator was created by Etienne Botes and Douglas Siepman, published in January 2010 in **Technical Analysis of Stocks & Commodities**. The authors were inspired by the

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work of Austrian naturalist Viktor Schauberger on the vortex movements of water — the spiral motion of currents generates directional force.

Applied to markets, the concept is: **bullish movement is an upward spiral** (each new High tends to be above the previous Low), and **bearish movement is a downward spiral** (each new Low tends to be below the previous High).

The Vortex Indicator produces two lines:

Line	Standard Color	What it Measures
VI+	Green	Strength of upward movement (upward vortex)
VI-	Red	Strength of downward movement (downward vortex)

Vortex vs other indicators in the series:

Feature	Vortex	ADX	Aroon	MACD
Basis	VM+/VM- (diagonal cross-bar)	DM+/DM- (unidirectional)	Time from extreme	EMA Close
Smoothing	**Rolling SUM** (no EMA/RMA)	Wilder RMA	None	EMA
Scale	**0.5 – 1.5** (not 0–100)	0–100	0–100	± from 0
Direction included	Yes (VI+ vs VI-)	Indirect (+DI/-DI)	Yes (Up vs Down)	Yes (from 0)
Lag	6.5 bars (rolling sum 14)	~13 bars (RMA cascade)	0 (direct)	~16.5 bars
Ghost effect	**Yes** (rolling sum, similar to SMA)	No (exponential RMA)	Indirect	No

---

2. Complete Calculation Formula

2.1 Step 1 — Vortex Movement (VM+ and VM-)

VM+ and VM- are **diagonal measurements** — they compare the extremes of the current bar with the extremes of the previous bar, in opposite directions:

```
VM+[i] = |High[i] − Low[i−1]|     ← how much the High rises above the previous Low
VM−[i] = |Low[i]  − High[i−1]|    ← how much the Low falls below the previous High
```

Why diagonals?

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The VM+ measurement captures the strength of the upward spiral: if the current bar makes a High significantly above the previous Low, it means the price has "spiraled up" over a previous minimum level. VM- captures the strength of the downward spiral.

This is the **fundamental difference from ADX** which uses:

```
DM+[i] = max(High[i] − High[i−1], 0)    ← difference of High vs High
DM−[i] = max(Low[i−1] − Low[i], 0)      ← difference of Low vs Low
```

ADX compares similar extremes (High vs High, Low vs Low). Vortex compares opposite extremes (High vs previous Low, Low vs previous High) — capturing the "crossing" of movements.

VM+ and VM- are ALWAYS positive (absolute value) — there are no zero cases excluded by logical conditions (unlike DM+ and DM- which can cancel each other out).

2.2 Step 2 — True Range (TR)

Identical to TR from ADX and SuperTrend:

```
TR[i] = max(High[i] − Low[i],
            |High[i] − Close[i−1]|,
            |Low[i]  − Close[i−1]|)
```

TR serves as a **normalizing denominator** — VM+ and VM- are reported relative to the actual volatility of the bar, not a fixed scale.

2.3 Step 3 — Rolling Sum and Normalization

Vortex uses a **rolling sum** (not a moving average, not RMA):

```
VI+[i] = sum(VM+[i−N+1 .. i]) / sum(TR[i−N+1 .. i])
VI−[i] = sum(VM−[i−N+1 .. i]) / sum(TR[i−N+1 .. i])
```

Both VI+ and VI- are divided by the **same** `sum(TR)` — common normalization relative to the period's volatility.

Properties of rolling sum:
- No multiplier K (no exponential smoothing)
- Each value in the window contributes with a weight of `1/N` (similar to SMA)
- **Active ghost effect:** when an extreme value exits the window, VI+ or VI- jumps abruptly

2.4 Complete Numeric Example — period=14, 40 bars

Manual verification for bar 15 (first valid value):

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```
VM+ window [bars 2..15]:
[1.99, 0.87, 1.01, 0.74, 1.13, 0.96, 1.58, 2.17, 2.08, 0.81, 1.48, 1.69, 1.35, 0.43]
Sum VM+ = 18.2900

VM- window:
[1.30, 0.96, 0.55, 1.13, 1.06, 0.98, 0.60, 1.05, 0.82, 0.82, 0.52, 0.66, 0.43, 0.95]
Sum VM- = 11.8300

TR window:
[1.09, 0.74, 0.82, 1.05, 1.14, 0.80, 1.38, 1.84, 1.06, 0.57, 1.43, 0.92, 0.86, 0.52]
Sum TR = 14.2200

VI+ = 18.2900 / 14.2200 = 1.2862  ✓
VI- = 11.8300 / 14.2200 = 0.8319  ✓
VI+ > VI- → BULLISH trend confirmed
```

Complete table for bars 15–40:

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Bar	Close	VI+	VI-	VI+>VI-	Spread	Regime
15	103.55	**1.2862**	0.8319	✓	0.454	Strong BULL
16	102.88	1.1369	0.8220	✓	0.315	BULL
17	102.28	1.1060	0.8645	✓	0.242	BULL
18	101.65	1.0398	0.9099	✓	0.130	Weak BULL
19	100.96	1.0073	0.9702	✓	0.037	Marginal BULL
20	100.81	1.0190	0.9902	✓	0.029	Marginal BULL
21	**100.46**	0.9753	**0.9859**	✗	0.011	**BEAR CROSS ★**
22	100.59	0.9488	1.0728	✗	0.124	BEAR
23	99.66	0.9134	1.1145	✗	0.201	BEAR
24	99.63	0.8150	1.1752	✗	0.360	Strong BEAR
25	99.60	0.8204	1.1470	✗	0.327	BEAR
30	102.90	1.0221	1.0328	✗	0.011	Marginal BEAR
31	**103.46**	**1.0341**	0.9547	✓	0.079	**BULL CROSS ★**
32	103.85	1.1008	0.9116	✓	0.189	BULL
35	105.95	1.2356	0.7449	✓	0.491	Strong BULL
38	107.92	1.3686	0.6123	✓	0.757	Extreme BULL
40	108.34	**1.4476**	**0.6072**	✓	**0.840**	Extreme BULL

Key Observations:

- Bear Cross at bar 21: spread = 0.0106 → **marginal crossover** (warning)
- Bull Cross at bar 31: spread = 0.0794 → more convincing
- VI+ can exceed 1.40 in a strong trend
- VI- can drop to 0.60 in an active bullish trend
- VI+ + VI- ≈ 1.92–2.12 (not constant)

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2.5 Alternative Parameters

Variant	Period	Warm-up	Lag	Characteristic
Standard	**14**	**15**	**6.5**	**PSEDYS default**
Fast	7	8	3.0	Reactive, more false signals
Slow	21	22	10.0	Macro filter, less noise
ADX-equivalent	14	15	6.5	Same period as standard ADX

3. Diagonal Logic of VM+ and VM- — Why It Works

3.1 Geometric Intuition

Imagine price movement as a spiral. A healthy uptrend looks like this:

```
Bar 1: Low=100, High=103
Bar 2: Low=101, High=104   ← Low[2] > Low[1], High[2] > High[1]

VM+[2] = |High[2] − Low[1]| = |104 − 100| = 4   (Current High WELL above previous Low)
VM−[2] = |Low[2]  − High[1]| = |101 − 103| = 2   (Current Low NOT below previous High)
→ VM+ > VM- → bullish strength
```

In a downtrend:

```
Bar 1: Low=100, High=103
Bar 2: Low=97, High=101

VM+[2] = |High[2] − Low[1]| = |101 − 100| = 1   (Current High barely above previous Low)
VM−[2] = |Low[2]  − High[1]| = |97 − 103| = 6   (Current Low WELL below previous High)
→ VM- > VM+ → bearish strength
```

3.2 Special Cases

Inside bar (High < High_prev, Low > Low_prev):

```
VM+ = |High_curr − Low_prev| — can be small
VM- = |Low_curr  − High_prev| — can be small (Low > High? → yes, absolute value)
→ Both VM small → low volatility → VI+ and VI- approach 1.0
```

Outside bar (High > High_prev, Low < Low_prev):

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```
VM+ = |High_curr − Low_prev| — large (High well above previous Low)
VM- = |Low_curr  − High_prev| — large (Low well below previous High)
→ Both VM large → both components rise
→ VI+ and VI- can both be > 1.0 simultaneously
```

3.3 VM+ vs DM+ (ADX) — Practical Difference

```
Bar: High[curr]=103, Low[curr]=101, High[prev]=102, Low[prev]=100

ADX DM+:  max(High[curr] − High[prev], 0) = max(103−102, 0) = 1
ADX DM-:  max(Low[prev] − Low[curr], 0)   = max(100−101, 0) = 0   ← canceled!

Vortex VM+: |High[curr] − Low[prev]| = |103−100| = 3
Vortex VM-: |Low[curr] − High[prev]| = |101−102| = 1

→ Vortex captures more of the price movement (does not cancel out)
→ ADX can give DM-=0 even when the bar is bullish and makes a lower Low (inside bar)
→ Vortex considers ANY cross-bar movement, regardless of intra-bar direction
```

4. VI Value Scale — Not 0–100

Vortex does not produce values between 0 and 100 like Aroon or ADX. The VI+ and VI- values depend on the ratio between VM movements and TR:

```
VI+ = Sum(VM+) / Sum(TR)

When VM+ ≈ TR:  VI+ ≈ 1.0  (bullish movement equal to total volatility)
When VM+ > TR:  VI+ > 1.0  (bullish movement greater than True Range — strong trend)
When VM+ < TR:  VI+ < 1.0  (bullish movement less than True Range — weak trend)
```

Typical range observed in crypto:

VI Value	Interpretation
> 1.40	Extreme Vortex in that direction — strong trend
1.20 – 1.40	Strong Vortex — active trend
1.00 – 1.20	Moderate Vortex — trend present
0.80 – 1.00	Weak Vortex — nascent or tired trend
< 0.80	Absent Vortex — sideways or dominant opposite trend

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VI+ + VI- is NOT constant. The sum typically varies between 1.9 and 2.1 in crypto, but is not guaranteed to be 2.0. This differs from +DI + -DI (ADX) which also does not sum to a constant.

---

5. Lag, Warm-up, and Ghost Effect

5.1 Lag

Vortex uses a rolling sum of N bars — lag identical to an N-bar SMA:

```
Lag = (N − 1) / 2 = (14 − 1) / 2 = 6.5 bars
```

In comparison: ADX (with RMA cascade) has a lag of ~13 bars. Vortex is **twice as fast** as ADX in signaling.

5.2 Warm-up

```
VM+/VM- available from bar 2 (requires previous bar)
First VI+/VI- value: bar N + 1 = bar 15 (for period=14)
Recommended warm-up: 2×N = 28 bars
Production: 50+ bars
```

5.3 Ghost Effect (specific to rolling sum)

Like SMA, Vortex has a Ghost Effect: when a bar with extreme VM+ or VM- **exits the N-bar window**, VI+ or VI- can make a sudden jump:

```
Scenario: bar with VM+=3.5 (bullish spike) is at the window's edge
When it exits: Sum(VM+) drops suddenly by 3.5 → VI+ drops sharply

→ Can generate a false BEAR CROSS signal immediately after the bullish spike exits the window
→ No real bearish movement — simply a Ghost Effect
```

Ghost Effect detection in Vortex:

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```
oldest_vmp = vm_plus[i - period + 1]   # bar exiting the window
oldest_vmm = vm_minus[i - period + 1]
atr_avg = sum(tr_list[i-period+1:i+1]) / period

ghost_risk_plus  = oldest_vmp > 2 * atr_avg   # Extreme VM+ at window edge
ghost_risk_minus = oldest_vmm > 2 * atr_avg   # Extreme VM- at window edge

if ghost_risk_plus or ghost_risk_minus:
    flag_possible_ghost_effect = True
```

---

6. Trading Signals

6.1 VI+ vs VI- — Direction

```
VI+ > VI-:  Upward vortex dominant → BULLISH bias
VI- > VI+:  Downward vortex dominant → BEARISH bias
VI+ ≈ VI-:  Balance of forces → transition or sideways
```

Difference from MACD (relative to 0): Vortex does not have a "zero line" — direction is determined by comparing the two lines, not against a fixed reference value.

6.2 Crossover VI+ × VI- — Main Signal

Bullish Crossover:

```
VI+ crosses above VI- from below
→ Bullish force exceeds bearish force
→ Signal: bullish trend change
→ Confirmation: spread increases in subsequent bars
```

Bearish Crossover:

```
VI- crosses above VI+ from above
→ Bearish force exceeds bullish force
→ Signal: bearish trend change
```

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6.3 Spread as a Measure of Signal Strength

```
Spread = |VI+ − VI-|

> 0.30:  Strong crossover → clear directional trend
0.10–0.30: Moderate crossover → valid signal, confirmation recommended
< 0.10:  Marginal crossover → high probability of false signal / re-crossover
```

From numeric example:
- Bear Cross bar 21: spread=0.011 → marginal → caution
- Bull Cross bar 31: spread=0.079 → moderate → valid signal

6.4 Filters for False Crossover

```
Filter 1 — MINIMUM SPREAD:
|VI+ − VI-| > 0.05 at the cross bar or the immediate next bar
Below 0.05 → skip or sizing 25%

Filter 2 — ADX CONFIRMATION:
ADX > 18 at crossover time → strong trend (not sideways)
ADX < 15 → high probability of false cross

Filter 3 — EMA CONFIRMATION:
Bullish Vortex Cross + Close > EMA20 → direction confirmation
Bearish Vortex Cross + Close < EMA20 → direction confirmation

Filter 4 — GHOST EFFECT CHECK:
Ensure the bar exiting the window (i−period+1) does not have extreme VM
If oldest_VM > 2×ATR_avg → skip crossover on this bar

Filter 5 — CLOSED CANDLE:
Crossover is validated on closed candle[-1], not intra-bar
```

6.5 BULLISH Signals — Long

- VI+ > VI- and spread increasing → active and accelerating bullish trend
- Bullish Crossover with spread > 0.10 and ADX > 18
- VI+ > 1.20 and VI- < 0.90 → dominant upward vortex

6.6 BEARISH Signals — Short

- VI- > VI+ and spread increasing → active bearish trend
- Bearish Crossover with spread > 0.10 and ADX > 18
- VI- > 1.20 and VI+ < 0.90 → dominant downward vortex

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6.7 NEUTRAL / To Avoid

- VI+ ≈ VI- (spread < 0.05) → balance, transition, sideways
- Both VI near 1.0 → VM movements equal to TR → directionless market
- ADX < 15 → even if Vortex shows direction, strength is lacking

---

7. Vortex vs ADX — Detailed Comparison

Vortex and ADX both measure the directional strength of price, but through radically different mechanisms.

Aspect	Vortex	ADX
VM Formula	Diagonal: `|High[i]−Low[i-1]|`	Unidirectional: `max(H[i]−H[i-1], 0)`
Smoothing	Rolling SUM (no decay)	Wilder RMA (K=1/N, exponential decay)
Ghost Effect	Yes — similar to SMA	No (exponential RMA)
Lag	6.5 bars (period=14)	~13 bars (cascade)
Scale	0.5–1.5	0–100 (ADX), 0–60 (DI)
Direction	Yes — VI+ vs VI- directly	Via +DI/-DI separately
Zero crossing	No — relative comparison	Implicit (ADX>0 always)
False signals	More frequent (lower lag)	Less frequent (higher lag, smoothing)
Sideways	VI+ ≈ VI- ≈ 1.0	ADX < 20

When Vortex beats ADX:
- Faster detection of trend reversals (lag 6.5 vs 13 bars)
- More sensitive to immediate behavioral changes

When ADX beats Vortex:
- Fewer false signals in volatile markets
- ADX > 25 = solid confirmation of strength, no ghost effect
- DI crossovers more reliable (Wilder smoothing eliminates noise)

Optimal combination:

```
Vortex BULLISH Crossover + ADX > 20 + +DI > -DI = dual confirmation (fast + solid)
Vortex BULLISH Crossover without ADX > 20 → Vortex signal, but unconfirmed strength
```

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8. Vortex in Sideways Market

8.1 Behavior in sideways

In a sideways market, VM+ and VM- are approximately equal (each bar has movements in both directions):

```
Normal sideways:
VM+ ≈ VM- on each bar → Sum(VM+) ≈ Sum(VM-)
→ VI+ ≈ VI- ≈ 1.0 (both close to total volatility)
→ Frequent crossovers with small spread → false signals
```

8.2 Sideways detection with Vortex

```
spread_vortex = abs(vi_plus - vi_minus)
both_near_one = abs(vi_plus - 1.0) < 0.10 and abs(vi_minus - 1.0) < 0.10

if spread_vortex < 0.05 or both_near_one:
    sideways_suspected = True
    skip_vortex_signal = True

# Confirmation with standard filters:
if choppiness > 61.8 or adx < 18:
    skip_vortex_signal = True
```

9. Multi-Timeframe Analysis (MTF)

9.1 MTF PSEDYS Hierarchy — Vortex

Level	Timeframe	Condition	Role
1 (Macro)	4H	VI+ > VI-, spread > 0.10	Macro directional bias
2 (Meso)	1H	VI+ > VI-, spread > 0.05	Medium trend confirmation
3 (Micro)	15M	Bullish crossover + spread > 0.05	Entry filter
4 (Entry)	5M	Crossover or VI+ > VI- with spread > 0.05	Entry timing

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9.2 MTF Alignment Score

VI 4H	VI 1H	VI 15M	VI 5M	Action
Bull □	Bull □	Bull □	Bull □	Full-size Long entry
Bull □	Bull □	Bull □	Recent Cross ⚠	Entry with 75% sizing
Bull □	Bull □	Neutral ⚠	any	Wait for 15M alignment
Bull □	Bear □	any	any	Skip — 1H bearish
Bear □	any	any	Bull	Skip — macro conflict

9.3 Vortex + ADX + EMA — Complete Setup

```
Long Setup with Vortex:
1. EMA 200 4H < price (macro EMA bullish)
2. Vortex 4H: VI+ > VI-, spread > 0.15
3. ADX 5M ≥ 18, +DI > -DI (trend strength)
4. EMA stack 5M bullish
5. Vortex 15M: Bullish crossover OR active VI+ > VI-
6. Vortex 5M: VI+ > VI-, spread > 0.05
7. Ghost effect check 5M: OK

→ Long Entry, SL below last swing low
```

10. PSEDYS — Vortex as Directional Filter

10.1 Vortex vs ADX in PSEDYS Context

Vortex can complement ADX as a directional filter — ADX confirms **strength**, Vortex confirms **direction** and **speed** of change:

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```
-- Positions with ADX > 18 (existing filter) can be further filtered with Vortex:
-- Back-calculation from GM candles at opened_at:
-- VI+ > VI- with spread > 0.10 at entry time → better entry quality

SELECT symbol, direction,
       (entry_features->>'adx')::float AS adx,
       (entry_features->>'ema_stack') AS ema_stack,
       realized_pnl
FROM bitget_trade_journal
WHERE (entry_features->>'adx')::float > 18
  AND lower(direction) = 'long'
ORDER BY realized_pnl DESC
LIMIT 20;
-- Correlate with Vortex calculated from GM API at opened_at
```

10.2 Vortex Crossover as ML Feature

Vortex crossover can be used as a binary feature in a scoring model:

```
vortex_bull = (vi_plus > vi_minus) and (vi_plus - vi_minus > 0.05)
vortex_bear = (vi_minus > vi_plus) and (vi_minus - vi_plus > 0.05)
# Feature: 1 = bullish vortex, -1 = bearish, 0 = neutral
vortex_signal = 1 if vortex_bull else (-1 if vortex_bear else 0)
```

---

11. Bot Validation vs TradingView

11.1 Main Sources of Divergence

Source	Probability	Impact
Sum window period vs period-1	High	Significant
VM+ formula: `|H[i]-L[i-1]|` vs `H[i]-L[i-1]` (without abs)	Medium	Minor (VM is usually positive)
Incomplete TR formula (without gap)	Medium	If exchange creates gaps

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11.2 Validation Checklist

```
STEP 1 — Check VM formulas:
□ VM+[i] = abs(highs[i] - lows[i-1])   ← ABS mandatory
□ VM-[i] = abs(lows[i]  - highs[i-1])  ← ABS mandatory
□ VM+ AND VM- are ALWAYS positive

STEP 2 — Check sum window:
□ sum(VM+[i-period+1:i+1]) → period elements
□ sum(TR[i-period+1:i+1])  → same number of elements
□ Both windows IDENTICAL in length

STEP 3 — Check TR:
□ TR = max(H-L, |H-C_prev|, |L-C_prev|) — with gaps

STEP 4 — Numeric test:
□ Compare VI+[-1] and VI-[-1] with TradingView
□ Tolerance: < 0.001 (deterministic calculation, rolling sum)
□ If different: check window length (period vs period+1)

STEP 5 — Ghost effect awareness:
□ At bar i, VM+[i-period+1] and VM-[i-period+1] exit the window
□ If these are extremes → VI can jump abruptly
□ Not an error — correct behavior (rolling sum)
```

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11.3 Python Validation Script

```
def vortex(highs, lows, closes, period=14):
    """
    Returns (vi_plus, vi_minus) — None for the first period bars
    """
    n = len(closes)
    vm_p = [None] + [abs(highs[i] - lows[i-1])  for i in range(1, n)]
    vm_m = [None] + [abs(lows[i]  - highs[i-1]) for i in range(1, n)]
    tr   = [None] + [max(highs[i]-lows[i],
                         abs(highs[i]-closes[i-1]),
                         abs(lows[i] -closes[i-1])) for i in range(1, n)]

    vi_p, vi_m = [None]*n, [None]*n
    for i in range(period, n):
        vp_sum = sum(vm_p[i-period+1:i+1])
        vm_sum = sum(vm_m[i-period+1:i+1])
        tr_sum = sum(tr[i-period+1:i+1])
        if tr_sum > 0:
            vi_p[i] = round(vp_sum / tr_sum, 6)
            vi_m[i] = round(vm_sum / tr_sum, 6)
    return vi_p, vi_m

# Validation: vi_p[-1] vs TradingView → difference < 0.001 = OK
```

---

12. Practical Exercises with Complete Answers

Exercise 1: Vortex crossover with small spread — do you enter?

Situation: On 5M, VI+ has just crossed above VI- (Bullish Crossover). VI+ = 1.0190, VI- = 1.0102. Spread = 0.009. ADX = 16. Choppiness = 63.

Question: Bullish Vortex Crossover on 5M. Do you enter Long?

Answer:

NO — three blocking filters simultaneously.

- **Spread = 0.009 < 0.05** → marginal crossover, nearly identical line crossing → high probability of immediate bearish re-cross
- **ADX = 16 < 18** → trend lacks strength → PSEDYS minimum threshold not met
- **Choppiness = 63 > 61.8** → confirmed sideways
- **Correct action:** Completely skip. Wait: spread > 0.10 + ADX > 18 + Choppiness < 55 to validate the crossover as a real signal.

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Exercise 2: VI+ = 1.45, VI- = 0.62 — extreme trend, do you still enter?

Situation: On 15M, VI+ = 1.45, VI- = 0.62, spread = 0.83. ADX = 42. Price has risen 8% in 15 hours. EMA stack bullish on 4H and 15M.

Question: Extremely bullish Vortex. Do you enter Long or is it too late?

Answer:

Enter with reduced sizing (50%) and tight SL — mature trend, not early entry.

- **VI+ = 1.45** = extremely upward vortex. Rarely reaches these values → confirms strong trend.
- **Spread = 0.83** = strongest possible spread in practice → no directional uncertainty.
- **ADX = 42** confirms strength.
- **But: 8% already risen** → we are late in the trend. Extreme VI+ + ADX > 40 = mature trend, potentially near peak.
- **Correct action:**
- Enter Long with 50% sizing (not full — mature trend)
- SL at EMA 20 on 15M or at last swing low
- TP1 at +1.5% (immediately) → secure 50% of position
- Strict trailing (SuperTrend 5M or PSAR)
- If VI+ decreases towards 1.20 with decreasing spread → exit the rest

---

Exercise 3: Ghost Effect — false cross

Situation: On 1H, 14 bars ago there was an extreme bullish spike (VM+ = 4.2, TR = 4.5 on that bar). At the current bar, that extreme bar exits the 14-bar window. VI+ drops abruptly from 1.35 to 1.08, VI- remains at 1.05 → Bear Cross.

Question: Bear Cross on VI — do you enter Short?

Answer:

NO — Ghost Effect active.

- **Diagnosis:** VM+ = 4.2 was ~3× the normal average (ATR avg ≈ 1.4). Exiting this bar from the window → Sum(VM+) drops abruptly by 4.2 → VI+ decreases artificially.
- **No real trend change** — price hasn't dropped, no new bearish pressure.
- **Confirmation:** check that 1H price hasn't produced new recent lows, ADX remains > 20, EMA stack bullish intact.
- **Correct action:** Ignore the crossover. Wait 2–3 bars for the window to "stabilize" after the spike exits. If VI- continues to rise independently (real bearish moves) → then consider the crossover valid.

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13. Cheat Sheet — Quick Summary

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Concept	Value / Rule
VM+ Formula	`abs(High[i] − Low[i−1])`
VM- Formula	`abs(Low[i] − High[i−1])`
VI+ Formula	`sum(VM+, N) / sum(TR, N)`
VI- Formula	`sum(VM−, N) / sum(TR, N)`
Smoothing	Rolling SUM — no EMA/RMA
Standard Period	14
Warm-up	period+1 = 15 bars
Lag	(period−1)/2 = 6.5 bars (same as SMA 14)
Scale	~0.5–1.5 (NOT 0–100)
VI+ > VI-	BULLISH Bias
VI- > VI+	BEARISH Bias
VI+ ≈ VI- ≈ 1.0	Equilibrium / sideways
Bullish crossover	VI+ crosses above VI-
Bearish crossover	VI- crosses above VI+
Spread > 0.30	Strong crossover
Spread 0.10–0.30	Moderate crossover
Spread < 0.05	Marginal crossover — skip or 25%
VI+ > 1.20 and VI- < 0.90	Extreme bullish trend
Ghost Effect	Extreme VM bar exits window → abrupt VI jump
Ghost filter	oldest_VM > 2×ATR_avg → skip crossover
Sideways filter	spread < 0.05 or both near 1.0
Standard filters	ADX > 18 + Choppiness < 61.8
Vortex vs ADX	Vortex: diagonal, rolling sum, lag 6.5; ADX: unidirectional, RMA, lag 13
Ghost Effect	Yes (rolling sum, like SMA) vs ADX: No (RMA)
Combination	Vortex Cross + ADX > 20 = dual confirmation
VM+ vs DM+	VM+ = cross-bar (H[i]−L[i-1]); DM+ = same-bar (H[i]−H[i-1])
Bot vs TV Tolerance	< 0.001 VI difference (deterministic calculation)
#1 Divergence Cause	Window period vs period-1 elements

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Concept	Value / Rule
#2 Divergence Cause	VM+ without abs() (rare but possible)
MTF Score 4/4	VI+ > VI-, spread > 0.10 on 4H+1H+15M+5M

PSEDYS Vortex Technical Manual v1.0 — May 2026
Covers: VM+/VM- diagonal formula (cross-bar vs ADX unidirectional), rolling SUM (no smoothing), common normalization to TR, verified numeric example (bar 15: VI+=1.2862, VI-=0.8319 ✓, Bear Cross bar 21, Bull Cross bar 31), scale 0.5–1.5 (not 0–100), lag 6.5 bars (vs ADX 13), warm-up 15 bars, Ghost Effect (similar to SMA — rolling sum), spread as signal strength measure (threshold 0.05/0.10/0.30), Vortex vs ADX complete comparison (diagonal vs unidirectional, rolling vs RMA), false cross filters (spread + ADX + ghost check), MTF with alignment score, PSEDYS query SQL, bot vs TradingView validation (window, abs()), Python script, 3 exercises

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