PSEDYS | TECHNICAL REFERENCE MANUAL V3.0

RVI — Relative Volatility Index

Technical Reference Manual v1.0

PSEDYS | Complete Edition
StdDev Gains/Losses · EMA Smoothing · RSI of Volatility · OB/OS · Directional Filter · MTF · Bot vs TradingView

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1. What is RVI? Concept and Origin

RVI (Relative Volatility Index) was created by **Donald Dorsey** and published in Technical Analysis of Stocks & Commodities (1995). RVI is an **RSI of volatility** — instead of comparing price gains/losses (Close vs previous Close), it compares volatility gains/losses (bar's StdDev based on direction).

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Philosophy: When the price rises with high volatility = strong bullish signal. When the price falls with high volatility = bearish pressure. RVI captures the intensity of volatility in the direction of the movement.

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2. Calculation Formula — Complete

2.1 Step 1 — StdDev Rolling

```
StdDev[i] = population_std(Close[i-stddev_period+1..i], ddof=0)
```

Standard stddev_period: 14

2.2 Step 2 — Gains/Losses based on StdDev

```
If Close[i] > Close[i-1]: Gain[i] = StdDev[i], Loss[i] = 0
If Close[i] < Close[i-1]: Gain[i] = 0, Loss[i] = StdDev[i]
If Close[i] = Close[i-1]: Gain[i] = 0, Loss[i] = 0
```

2.3 Step 3 — EMA on Gains and Losses

```
k = 2 / (rvi_period + 1)    ← Standard EMA

AvgGain[seed] = SMA(Gain[first_valid..seed])   ← seed SMA
AvgGain[i]    = Gain[i] × k + AvgGain[i-1] × (1-k)

AvgLoss[seed] = SMA(Loss[first_valid..seed])
AvgLoss[i]    = Loss[i] × k + AvgLoss[i-1] × (1-k)
```

Standard rvi_period: 14

2.4 Step 4 — Final RVI

```
RVI[i] = 100 × AvgGain[i] / (AvgGain[i] + AvgLoss[i])
```

When AvgGain + AvgLoss = 0: RVI = 50 (neutral).

2.5 Complete Numeric Example — stddev_period=14, rvi_period=14

Warm-up:

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```
First StdDev value: bar stddev_period = bar 14 (index 13)
RVI seed: bar stddev_period + rvi_period - 1 = bar 27 (index 26)
First RVI value: bar 27
```

Verification bar 27 (seed):

```
AvgGain[27] = SMA(Gain[14..27]) / 14 = 0.6662
AvgLoss[27] = SMA(Loss[14..27]) / 14 = 0.6140

RVI[27] = 100 × 0.6662 / (0.6662 + 0.6140) = 52.04  ✓  (neutral)
```

RVI Table bars 27–41:

Bar	StdDev	AvgGain	AvgLoss	RVI	Zone
27	1.143	0.666	0.614	52.04	NEUTRAL
28	1.117	0.620	0.724	45.88	NEUTRAL
29	1.022	0.596	0.865	40.79	NEUTRAL
33	1.198	0.986	0.527	**64.46**	OB
34	1.426	1.158	0.493	**70.14**	OB
35	1.748	1.461	0.447	**75.64**	OB
39	2.758	2.310	0.565	**80.46**	OB
40	3.148	2.779	0.507	**84.65**	OB
41	3.441	3.217	0.437	**87.92**	OB

Observation: in active bullish trend (bars 33–41), RVI reaches 88 — high volatility on bullish movements predominates.

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3. RVI Levels — Interpretation

RVI	Zone	Meaning
> 70	**OB**	Dominant bullish volatility — strong or extreme trend
60–70	Bullish	Bullish volatility bias
40–60	**Neutral**	Balanced volatility
30–40	Bearish	Bearish volatility bias
< 30	**OS**	Dominant bearish volatility

Threshold variants: some traders use 60/40 or 80/20 for more selective signals.

4. Lag and Warm-up

```
StdDev warm-up: 14 bars
Total RVI warm-up: 14 + 14 - 1 = 27 bars
Lag: ~14 bars (dominant EMA smoothing)
```

5. Trading Signals

5.1 OB/OS Signals

```
RVI > 60 (or > 70 conservative): dominant bullish volatility
  → Long Confirmation; no Short signal

RVI < 40 (or < 30 conservative): dominant bearish volatility
  → Short Confirmation; no Long signal

RVI cross 50 bullish (from < 50 to > 50): volatility balance tilted bullish
→ Moderate Long signal

RVI cross 50 bearish: → Moderate Short signal
```

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5.2 Directional Filter Combined with RSI

```
Recommended Dorsey combination:
  RSI > 50 AND RVI > 50 → Confirmed Long (bullish price and volatility)
  RSI < 50 AND RVI < 50 → Confirmed Short
  RSI > 50 AND RVI < 50 → Weak signal / skip
  RSI < 50 AND RVI > 50 → Ambiguous signal / skip
```

5.3 Divergences

```
Bearish divergence: Price HH + RVI LH → bullish volatility weakening at new highs
Bullish divergence: Price LL + RVI HL → bearish volatility weakening at new lows
```

5.4 Combined Filters

```
entry_long = (
    rvi > 60 and              # dominant bullish volatility
    rsi > 50 and              # price above RSI average
    ema_stack_bullish and
    adx > 20
)
```

6. RVI vs RSI — Comparison

Aspect	RVI	RSI
Gains/Losses	StdDev (volatility)	Close vs previous Close
Smoothing	Standard EMA K=2/(N+1)	Wilder RMA K=1/N
Range	0–100	0–100
OB/OS	> 60/< 40 (or 70/30)	> 70/< 30
Warm-up	2×period − 1 = 27 bars	period+1 bars = 15 bars
What it measures	Intensity of directional volatility	Speed of Close movement
Complement	Yes — RVI + RSI = double confirmation	

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7. RVI in Sideways and Trend Markets

Sideways: RVI oscillates around 50. Volatility is relatively evenly distributed between rises and falls. Frequent and false OB/OS signals.

Bullish trend: RVI maintains above 50, often > 60–70. Volatility concentrated on bullish bars.

Bearish trend: RVI maintains below 50, often < 30–40.

8. MTF

Level	Timeframe	Long Condition
Macro	4H	RVI > 50 (bullish volatility on 4H)
Meso	1H	RVI > 50 and rising
Entry	5M	RSI + RVI both > 50 → Long

9. PSEDYS — RVI as a Directional Volatility Filter

```
# Directional confirmation
vol_bullish = rvi > 60      # volatility concentrated on bullish
vol_bearish = rvi < 40      # volatility concentrated on bearish
vol_neutral = 40 <= rvi <= 60

# Combined RSI
strong_long = rvi > 60 and rsi > 55 and ema_stack_bullish
strong_short = rvi < 40 and rsi < 45 and ema_stack_bearish
```

10. Bot vs TradingView Validation

```
□ StdDev: ddof=0 (population), period=14
□ Gains: Gain[i] = StdDev[i] if Close[i] > Close[i-1], otherwise 0
□ EMA smoothing: K=2/(period+1) — NOT Wilder K=1/N
□ Seed: SMA on the first rvi_period valid Gain/Loss values
□ RVI = 100 × AvgGain / (AvgGain + AvgLoss)
□ Warm-up: stddev_period + rvi_period - 1 = 27 bars
□ Tolerance: < 0.1
```

Python Script:

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```
def rvi(closes, stddev_period=14, rvi_period=14):
    import math
    n = len(closes); k = 2/(rvi_period+1)
    sd = [None]*n
    for i in range(stddev_period-1, n):
        w = closes[i-stddev_period+1:i+1]; m = sum(w)/stddev_period
        sd[i] = math.sqrt(sum((x-m)**2 for x in w)/stddev_period)
    gain = [0.0]*n; loss = [0.0]*n
    for i in range(1, n):
        if sd[i] is None: continue
        if closes[i] > closes[i-1]: gain[i] = sd[i]
        elif closes[i] < closes[i-1]: loss[i] = sd[i]
    fv = stddev_period-1; seed = fv+rvi_period-1
    ag = [None]*n; al = [None]*n
    ag[seed] = sum(gain[fv:seed+1])/rvi_period
    al[seed] = sum(loss[fv:seed+1])/rvi_period
    for i in range(seed+1, n):
        ag[i] = gain[i]*k + ag[i-1]*(1-k)
        al[i] = loss[i]*k + al[i-1]*(1-k)
    rvi_v = [None]*n
    for i in range(n):
        if ag[i] is not None:
            d = ag[i]+al[i]
            rvi_v[i] = 100*ag[i]/d if d > 0 else 50.0
    return rvi_v
```

---

11. Practical Exercises

Exercise 1: RVI=82 in bullish trend — exit Long?

Situation: On 4H, RVI = 82, RSI = 68. EMA stack bullish. ADX = 35.

Answer: No exit — riding with tight trailing SL. RVI = 82 = extremely dominant bullish volatility. Not a Short signal. Tighten trailing SL to 1.5×ATR. Exit at RVI < 60 or RSI < 50.

Exercise 2: RSI > 50 but RVI < 40 — entry Long?

Situation: On 1H, RSI = 58 (bullish), RVI = 36 (bearish volatility). EMA stack bullish.

Answer: Skip or minimal sizing. Bullish RSI + bearish RVI = contradictory signal. Price is rising but volatility is concentrated on bearish bars → bullish move without conviction. Wait for RVI > 50 for confirmation.

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12. Cheat Sheet — Quick Summary

Concept	Value / Rule
StdDev	`population_std(Close, 14)` — ddof=0
Gain	StdDev[i] if Close > Close[i-1]
Loss	StdDev[i] if Close < Close[i-1]
AvgGain/Loss	`EMA(Gain/Loss, 14)` — K=2/(N+1)
RVI	`100 × AvgGain / (AvgGain + AvgLoss)`
Warm-up	27 bars (14+14−1)
OB	> 60 (or > 70 conservative)
OS	< 40 (or < 30 conservative)
Neutral	50
RVI > 50	Dominant bullish volatility
RVI < 50	Dominant bearish volatility
Combined RSI	RSI>50 + RVI>50 = Confirmed Long
Cause #1 divergence	Wilder K=1/N instead of EMA K=2/(N+1)
Cause #2 divergence	ddof=1 in StdDev instead of ddof=0

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