PSEDYS | TECHNICAL REFERENCE MANUAL V3.0

Aroon Indicator — Technical Reference Manual v1.0

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PSEDYS | Complete Edition

Aroon Up · Aroon Down · Aroon Oscillator · Time vs Price · Granularity · Window Edge Effect · Consolidation · Parallelism · Aroon vs ADX · MTF · Bot vs TradingView

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1. What is Aroon? Concept and Temporal Philosophy

Aroon (□□□□ — "light of dawn" in Sanskrit) was created by Tushar Chande in 1995. It is a **trend-timing** indicator that measures **how recently** the highest High and the lowest Low occurred in the last N bars — not the magnitude of the movement, but the **age of the extremes**.

Fundamental Philosophy: A healthy bullish trend regularly makes new highs. If the highest High in the last 25 bars occurred 20 bars ago, the bullish trend is tired, regardless of how high the price is.

Aroon vs all other indicators in the series:

Indicator	Calculation Basis	What it Measures
EMA/SMA	Close (weighted average)	Price direction (average)
MACD	EMA(Close)	Trend speed
ADX	High, Low, Close (DM, TR)	Trend strength (magnitude)
PSAR/ SuperTrend	High, Low (ATR, EP)	Dynamic trailing stop
Aroon	**High, Low (time from extreme)**	**Age of extremes — WHEN was the last High/Low**

Aroon is the only indicator in the series without any form of smoothing — no EMA, no RMA, no SMA. The calculation is purely deterministic, based solely on the temporal position of extremes in the lookback window.

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2. Calculation Formula — Complete

2.1 Aroon Up

```
Aroon_Up[i] = (idx_max / period) × 100

Where:
  Window: High[i−period .. i]  (period+1 bars including the current bar)
  idx_max = index of the most RECENT highest High in the window
            (idx 0 = oldest bar, idx period = current bar)

Equivalent to:
  Aroon_Up = ((period − bars_since_highest_High) / period) × 100

  bars_since_highest_High = period − idx_max
                          = number of bars since the last highest High until today
```

Boundary Values:

```
Aroon_Up = 100: Highest High right on the current bar (idx_max = period, bars_since = 0)
Aroon_Up = 96:  Highest High 1 bar ago              (bars_since = 1)
Aroon_Up = 0:   Highest High period bars ago        (idx_max = 0, bars_since = period)
```

2.2 Aroon Down

```
Aroon_Down[i] = (idx_min / period) × 100

Where:
  idx_min = index of the most RECENT lowest Low in the window
  Equivalent: (period − bars_since_lowest_Low) / period × 100
```

Boundary Values:

```
Aroon_Down = 100: Lowest Low right on the current bar
Aroon_Down = 0:   Lowest Low period bars ago (oldest possible)
```

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2.3 Aroon Oscillator

```
Aroon_Oscillator = Aroon_Up − Aroon_Down

Range: −100 ... +100

> 0:    Last High more recent than last Low → bullish temporal strength
< 0:    Last Low more recent than last High → bearish temporal strength
= 0:    Temporal balance (High and Low at the same distance) → transition
```

2.4 Simple Verified Example (period=5)

Data (6 bars):

Bar	High	Low
1	10	8
2	12	9
3	11	9
4	**13**	10
5	10	**7**
6 (current)	11	8

Calculation at bar 6 (window: bars 2-6, period=5):

```
Window Highs (idx 0..5): [10, 12, 11, 13, 10, 11]   ← 0=bar2, 5=bar6(current)
Window Lows  (idx 0..5): [ 8,  9,  9, 10,  7,  8]

Highest High = 13 → at idx_max = 3 → bars_since = 5 − 3 = 2 bars
Aroon_Up = (5 − 2) / 5 × 100 = 3/5 × 100 = 60.0  ✓

Lowest Low = 7 → at idx_min = 4 → bars_since = 5 − 4 = 1 bar
Aroon_Down = (5 − 1) / 5 × 100 = 4/5 × 100 = 80.0  ✓

Aroon_Oscillator = 60.0 − 80.0 = −20.0
→ Last Low (1 bar ago) is more recent than last High (2 bars ago) → slightly bearish
```

2.5 Complete Numeric Example — period=25, 50 bars

Data: initial uptrend (bars 1–20), pullback (21–30), new uptrend (31–50)
Start price ~100 → End price ~113.47

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Manual verification bar 26 (first valid value):

```
Highest High in window [bars 1..26] = 106.78 → at bar 20 → 6 bars ago
Aroon_Up   = (25 − 6) / 25 × 100 = 19/25 × 100 = 76.00  ✓

Lowest Low in window [bars 1..26] = 99.26 → at bar 2 → 24 bars ago
Aroon_Down = (25 − 24) / 25 × 100 = 1/25 × 100 = 4.00  ✓

Aroon_Oscillator = 76.00 − 4.00 = 72.00 → STRONG BULL temporal  ✓
```

Table bars 26–50:

Bar	Close	Aroon Up	Aroon Down	Osc	Regime
26	104.41	**76.0**	4.0	+72.0	STRONG BULL
27	104.32	**72.0**	0.0	+72.0	STRONG BULL
28	104.05	68.0	0.0	+68.0	BULL bias
33	104.83	48.0	0.0	+48.0	CONSOLIDATION
34	105.51	44.0	4.0	+40.0	CONSOLIDATION
36	**106.35**	**100.0**	0.0	+100.0	**STRONG BULL** ← new High!
37	107.18	**100.0**	4.0	+96.0	STRONG BULL
38	107.46	**100.0**	0.0	+100.0	STRONG BULL
40	108.26	100.0	60.0	+40.0	NEUTRAL
45	111.08	100.0	40.0	+60.0	BULL bias
48	112.12	100.0	28.0	+72.0	STRONG BULL
50	113.47	100.0	20.0	+80.0	STRONG BULL

Key Observations from the Table:

- Bars 26–27: Aroon_Up = 76–72 (Highest High 6–7 bars ago), Aroon_Down ≈ 0 (Lowest Low almost at the end of the 25-bar window) → confirmed bullish trend
- Bars 28–35: Aroon_Up decreases from 68 to 44 (Highest High getting older, no new highs) → consolidation
- Bar 36: Aroon_Up jumps to **100** → new Highest High on the current bar → strong bullish breakout
- Bars 36–50: Aroon_Up = 100 constant → price makes new highs on each bar or at short intervals → active uptrend

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2.6 Granularity of Aroon Values

Aroon cannot take any value — it is **discrete**, with equal step at `100/period`:

```
period = 25: step = 100/25 = 4% → possible values: 0, 4, 8, 12, ..., 96, 100
period = 14: step = 100/14 ≈ 7.14% → possible values: 0, 7.14, 14.29, ..., 100
period = 10: step = 100/10 = 10% → possible values: 0, 10, 20, ..., 100
period = 50: step = 100/50 = 2% → possible values: 0, 2, 4, ..., 100
```

Consequence: With period=25, Aroon cannot be "63%" or "71%" — it can be 60, 64, 68, 72... Fractional values on an Aroon chart indicate different implementation or period.

2.7 Alternative Parameters

Variant	Period	Step	Warm-up	Characteristic
Standard	**25**	**4%**	**26**	**PSEDYS default**
Fast	14	7.14%	15	More reactive, coarser granularity
Slow	50	2%	51	Macro filter, fewer false signals
Ultra-fast	10	10%	11	Scalp — noisy on small TF

3. Temporal Logic — Aroon Measures WHEN, Not HOW MUCH

3.1 Example of Common Confusion

```
Scenario A: BTC rises from 40,000 to 60,000 in 30 days (strong rise)
            But the last High was 20 days ago
            → Aroon_Up = (25−20)/25×100 = 20% → SIGNALS TIRED TREND

Scenario B: BTC makes modest new highs +0.5% per day, every day
            → Aroon_Up = 100% every day → SIGNALS ACTIVE TREND
```

Conclusion: Aroon does not evaluate the strength or magnitude of the movement (that's what ADX does). It evaluates whether the price **continues to make new highs** — the frequency of extremes, not their amplitude.

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3.2 Aroon vs ADX — Main Difference

Aspect	Aroon	ADX
What it measures	When the last extreme occurred	How strong the directional movement is
Basis	Time (bars)	Prices (DM, TR)
Signal at new High/ Low	Aroon_Up/Down = 100 immediately	ADX increases gradually (Wilder RMA)
Signal at consolidation	Both fall below 50	ADX falls below 20
Lag	None for recent extremes	~13 bars (RMA cascade)
Smoothing	None	Wilder RMA

Combined Use: ADX > 20 (trend has strength) + Aroon_Up > 70 (extremes are recent) = double confirmation — active and recently confirmed trend.

---

4. Window Edge Effect — Sudden Jump to 0

This is the **most important property to understand** for the correct implementation of Aroon in a bot.

4.1 Definition

Window Edge Effect occurs when the bar with the most extreme High (or Low) from a previous period **exits the lookback window**. At that moment, Aroon_Up (or Down) makes a sudden jump to 0 or a much lower value — even if the price has not made any significant movement.

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4.2 Concrete Example

```
Setup: period=25, previous bullish trend with maximum High at bar 100

At bar 125: window = bars 101–125
  → Bar 100 HAS EXITED the window
  → The new Highest High in the window is at bar 101 (or more recent)
  → If bar 101 did not match bar 100: Aroon_Up jumps suddenly to a low value

At bar 124: window = bars 100–124
  → Bar 100 still in the window (Highest High)
  → Aroon_Up = (25 − 25) / 25 × 100 = 0% (exactly at the end, but IN the window)

At bar 125: window = bars 101–125
  → Bar 100 EXITED
  → If the new Highest High = bar 101: Aroon_Up = (25−24)/25×100 = 4%
  → Or if the new Highest High = bar 115: Aroon_Up = (25−10)/25×100 = 60%

→ Possible jump: from 0% to 60% IN A SINGLE BAR → artificial signal
```

4.3 Detecting window edge effect in bot

```
def has_edge_effect(highs, lows, i, period):
    """Detects if the extreme in the current window is at the edge (idx=0 or idx=period-1)"""
    wh = highs[i-period:i+1]
    wl = lows[i-period:i+1]
    idx_max = max(j for j, v in enumerate(wh) if v == max(wh))
    idx_min = max(j for j, v in enumerate(wl) if v == min(wl))
    # If the extreme is in the first 2 positions in the window → risk of edge effect at the next
    edge_risk_up   = idx_max <= 1
    edge_risk_down = idx_min <= 1
    return edge_risk_up, edge_risk_down

# If edge_risk_up = True → in 1–2 bars, Aroon_Up may jump suddenly
# → do not act on the Aroon_Up signal until stabilization
```

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4.4 Implication for signals

```
Aroon_Up jumps from 0 to 100 in 1 bar:
→ NOT a strong bullish trend signal
→ Could simply be window edge effect (old High exited the window)
→ Check: did the price actually make a new High on the current bar? (Close ≈ current High)
→ If YES: valid signal. If NO: likely window edge effect
```

---

5. Lag and Warm-up

5.1 Lag

Aroon does not have lag in the classic sense of moving averages (there is no smoothing). Its values are **instantaneous** relative to the position of the extremes.

However, there is a "conceptual lag":
- Aroon detects extremes from the last N bars → represents the state from the past
- Does not anticipate — confirms that extremes have appeared recently

```
At a new High on the current bar: Aroon_Up jumps immediately to 100 → lag = 0
At a High not confirmed for 10 bars: Aroon_Up = 60% → conceptual lag = 10 bars
```

5.2 Warm-up

```
Required bars: period + 1 = 26 bars (for period=25)
  → First value at bar 26 (index 25)
  → First 25 bars: no Aroon value available

Cold start: no cascade of seeds → simple and robust
  → Starting with 26+ bars → first value immediately correct
  → No warm-up distortion (unlike MACD, ADX)
```

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6. Aroon Values — Complete Interpretation Table

Aroon Up/ Down Value	Bars Since Extreme	Classification	Meaning
100%	0 bars	Fresh extreme	High/Low on the current bar — maximum active trend
96%	1 bar	Recent extreme	High/Low 1 bar ago
88%	3 bars	Recent extreme	—
80%	5 bars	Recent extreme	—
70%	**7-8 bars**	**Minimum bull/bear threshold**	**Below 70 = tired trend**
60%	10 bars	Medium	High/Low at the middle of the window
50%	12-13 bars	Neutral	Exactly in the middle of the period
30%	**17-18 bars**	**Sideways threshold**	**Below 30 = old extreme**
20%	20 bars	Old extreme	—
4%	24 bars	Extreme at the edge	High/Low near the end of the window
0%	25 bars	Extreme at the end of the window	Risk of window edge effect

7. Trading Signals

7.1 Aroon Bullish and Bearish — Thresholds

STRONG BULLISH SIGNAL:

```
Aroon_Up ≥ 70 AND Aroon_Down ≤ 30
→ Last High recent (< 7 bars) + Last Low old (> 17 bars)
→ Active and sustained bullish trend
```

STRONG BEARISH SIGNAL:

```
Aroon_Down ≥ 70 AND Aroon_Up ≤ 30
→ Last Low recent (< 7 bars) + Last High old (> 17 bars)
→ Active and sustained bearish trend
```

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WEAK BULLISH / BEARISH SIGNAL:

```
Aroon_Up ≥ 50 AND Aroon_Down ≤ 50 → bullish bias (Up more recent)
Aroon_Down ≥ 50 AND Aroon_Up ≤ 50 → bearish bias (Down more recent)
```

NEUTRAL / CONSOLIDATION:

```
Both below 50 → no recent extreme → sideways or transition
```

7.2 Aroon Crossover (Up × Down)

Bullish Crossover:

```
Aroon_Up crosses above Aroon_Down
→ The most recent High becomes more recent than the most recent Low
→ Signal of a shift towards a bullish trend
→ Most reliable if the crossover occurs above the 50 level
```

Bearish Crossover:

```
Aroon_Down crosses above Aroon_Up
→ The most recent Low becomes more recent than the most recent High
→ Signal of a shift towards a bearish trend
```

Strength of the crossover based on level:

Level at crossover	Signal strength
Both > 50 at cross	Strong — active trend changes
Both ≈ 50	Neutral — market in transition
Both < 30	Weak — extreme from deep consolidation

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7.3 Aroon Oscillator — Signals

```
Oscillator > 0 and rising:  bullish trend intensifies (Up advances over Down)
Oscillator > 50:             solid bullish trend
Oscillator > 80:             strong bullish trend
Oscillator = +100:           Aroon_Up=100, Aroon_Down=0 — extreme bullish trend

Oscillator < 0 and falling:  bearish trend intensifies
Oscillator < −50:            solid bearish trend
Oscillator < −80:            strong bearish trend
Oscillator = −100:           Aroon_Down=100, Aroon_Up=0 — extreme bearish trend

Oscillator ≈ 0:              transition or temporary equilibrium
```

Zero cross of the Oscillator = crossover signal (mathematically identical to Up × Down cross).

7.4 Consolidation (Both Below 50)

When both Aroon_Up and Aroon_Down are below 50, it means:
- Last High > 12 bars ago
- Last Low > 12 bars ago
- The market has not established new extremes in the first half of the window
- **Meaning:** consolidation or range → skip signals based on Aroon

```
consolidation = aroon_up < 50 and aroon_down < 50
if consolidation:
    skip_aroon_signal = True
```

7.5 Parallelism (Both Above 70)

Rarer situation: both Aroon_Up and Aroon_Down are > 70:

```
Aroon_Up > 70 AND Aroon_Down > 70:
→ Both Highest High and Lowest Low are recent (< 7 bars)
→ Meaning: volatile market making SIMULTANEOUS new highs AND new lows
→ Not a direction signal — it is a signal of extreme volatility
→ Practically: expanding range, bilateral spikes, possible capitulation or euphoria

Action: do not trade on Aroon in this condition — ADX and ATR will be more useful
```

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7.6 Filters for False Signals

```
Filter 1 — WINDOW EDGE EFFECT:
Check that Aroon_Up (or Down) is not an artificial jump from window edge
Condition: if the bar 2 hours ago (idx=1 in window) held the previous extreme
→ Discount the signal until confirmed with price

Filter 2 — ADX CONFIRMATION:
ADX > 20 confirms that the trend has strength, not just that the extreme is recent
Aroon_Up ≥ 70 + ADX > 20 = double confirmed signal

Filter 3 — EMA CONFIRMATION:
Aroon_Up ≥ 70 + price > EMA20 + bullish EMA stack = direction confirmation

Filter 4 — LEVEL AT CROSSOVER:
Crossovers below level 30 → skip (old extremes crossing)
Crossovers at ≈ 50 → valid transition signal
Crossovers above 70 → strong signal

Filter 5 — CLOSED CANDLE:
All Aroon signals validate on closed candle
```

8. Aroon vs ADX — Detailed Comparison

Aroon and ADX are often confused as measuring the same thing — trend strength. They are **fundamentally different**.

Aspect	Aroon	ADX
What it measures	When (time since extreme)	How much (magnitude of DM relative to TR)
Basis	Time (number of bars)	Prices (DM, TR, DX)
Smoothing	None	Wilder RMA (cascade)
Lag	0 for current extremes	~13 bars
Warm-up	period+1 = 26 bars	2×period+1 = 29 bars
Range	0–100	0–100
Sideways signal	Both < 50	ADX < 20
Direction	Yes — Up vs Down	Not directly (via +DI/-DI)
High volatility	Both > 70 (parallelism)	ADX rises regardless of direction

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Scenarios where they differ:

```
Strong BUT old trend (High 20 bars ago):
→ ADX = 40 (strong trend confirmed in the past)
→ Aroon_Up = 20 (old High → trend TIRED according to Aroon)
→ Conclusion: trend existed but loses temporal momentum

Weak BUT consistent trend (small new highs every day):
→ ADX = 18 (low strength)
→ Aroon_Up = 100 every day
→ Conclusion: active trend temporarily, even if magnitude is small
```

Recommended combined use:

```
ADX > 20 (strength) + Aroon_Up ≥ 70 (recent) = active AND recent trend → ideal setup
ADX > 20 (strength) + Aroon_Up < 50 (old)  = trend losing frequency → caution
ADX < 20 (weak)  + Aroon_Up = 100 (fresh) = new incipient trend → anticipatory entry (risk)
```

---

9. Aroon in Sideways Market

9.1 Behavior in Sideways

In a sideways market, the price alternates between highs and lows at short intervals:

```
Bar N:    new Low → Aroon_Down = 100, Aroon_Up = 20 → false BEAR signal
Bar N+3:  new High → Aroon_Up = 100, Aroon_Down = 64 → false BULL signal
Bar N+6:  new Low → false BEAR signal
→ Multiple false signals in both directions
```

9.2 Detecting Sideways with Aroon

```
# Sideways criteria with Aroon:
both_below_50 = aroon_up < 50 and aroon_down < 50   # no dominant direction
spread_small  = abs(aroon_up - aroon_down) < 20     # Up and Down close together
oscillator_near_zero = abs(aroon_osc) < 20

# Plus standard filters:
choppiness    = choppiness_index > 61.8
adx_weak      = adx < 18
```

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10. Multi-Timeframe Analysis (MTF)

10.1 MTF PSEDYS Hierarchy — Aroon

Level	Timeframe	Aroon Condition	Role
1 (Macro)	4H	Aroon_Up ≥ 50 and > Aroon_Down	Macro bullish bias
2 (Meso)	1H	Aroon_Up ≥ 70	Medium-term trend confirmed
3 (Micro)	15M	Aroon_Up ≥ 70 + Osc > 50	Entry filter
4 (Entry)	5M	Aroon_Up ≥ 70 or Bullish Crossover	Entry timing

10.2 MTF Aroon Alignment Score

Aroon 4H	Aroon 1H	Aroon 15M	Aroon 5M	Action
Bull □	Up≥70 □	Up≥70 □	Up≥70 □	Confirmed Long Entry
Bull □	Up≥70 □	Up≥70 □	Neutral ⚠	Entry with reduced sizing, wait for Aroon 5M
Bull □	Up≥70 □	< 50 □	any	Skip — 15M lacks recent trend
Bull □	< 50 □	any	any	Skip — 1H in consolidation

10.3 Aroon + ADX + EMA — Optimal Combination

```
Complete Long setup with Aroon:
1. EMA 200 4H < price (macro EMA bullish)
2. Aroon_Up 4H ≥ 50, Up > Down (bullish temporal trend 4H)
3. ADX 5M ≥ 18, +DI > -DI (trend strength)
4. EMA stack 5M bullish
5. Aroon_Up 15M ≥ 70 (recent extreme on filter)
6. Aroon_Up 5M ≥ 70 or Aroon bullish crossover 5M

→ 6 simultaneous confirmations → high probability entry
```

11. PSEDYS — Aroon as Trend Age Filter

11.1 Role of Aroon in Scoring System

Aroon provides a **temporal** perspective not covered by ADX or EMA. It can be used to assess whether a trend detected by other indicators is **fresh** or **tired**:

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```
EMA stack bullish + MACD bullish + ADX > 25 → trend exists
PLUS Aroon_Up ≥ 70 → trend continues to make new highs → fresh signal
VERSUS Aroon_Up = 20 → price hasn't set a new High for 20 bars → tired trend
```

11.2 Useful Query for Correlating Aroon with Entries

```
-- Analysis: entries with "fresh" trend (Aroon hypothetic > 70 at entry) vs "tired"
-- Aroon is not stored directly in entry_features, but can be calculated retroactively
-- from GM API data at entry time

SELECT symbol, direction, profile_name,
       entry_price, realized_pnl,
       (entry_features->>'adx')::float AS adx_entry,
       (entry_features->>'ema_stack')  AS ema_stack
FROM trade_journal
WHERE realized_pnl IS NOT NULL
ORDER BY realized_pnl DESC
LIMIT 20;
-- Correlate with Aroon calculated from GM candles at opened_at
```

---

12. Bot vs TradingView Validation

12.1 Main Sources of Divergence

Source	Probability	Impact
Most RECENT high vs OLDEST high (on tie)	High	Significant
Period window vs period+1 bars	Medium	1 bar lag
High/Low vs Close as base	Medium	Minor

12.2 Tie-breaking Rule for High/Low

When multiple bars have the same maximum High in the window, TradingView uses the **most recent** (rightmost). Some implementations use the first occurrence (leftmost) → different Aroon.

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```
# WRONG — firstmost occurrence (leftmost):
idx_max = wh.index(max(wh))

# CORRECT — most recent occurrence (rightmost, TradingView behavior):
idx_max = max(j for j, v in enumerate(wh) if v == max(wh))
```

12.3 Correct Window

```
# WRONG — period bars window (does not include current bar):
wh = highs[i-period:i]      # period bars: i-25..i-1

# CORRECT — period+1 bars window (includes current bar):
wh = highs[i-period:i+1]    # period+1 bars: i-25..i inclusive
```

12.4 Validation Checklist

```
STEP 1 — Correct Window:
□ high[i-period:i+1] → period+1 elements (including current bar)
□ low[i-period:i+1]  → same

STEP 2 — Tie-breaking:
□ Most RECENT high/low (rightmost)
□ Not first (leftmost)

STEP 3 — Correct Formula:
□ Aroon_Up   = idx_max / period * 100
□ Aroon_Down = idx_min / period * 100
□ idx ∈ [0, period] where 0=oldest, period=current

STEP 4 — Numeric Test:
□ Compare with TradingView on the same symbol/TF
□ Tolerance: 0% (Aroon is deterministic — no reason for divergence if formula is correct)
□ If different by 4% → off-by-one in window
□ If different by large value → wrong tie-breaking or window

STEP 5 — Granularity:
□ Check values are multiples of 100/period
□ Ex: period=25 → allowed values: 0, 4, 8, 12, ..., 96, 100
□ Any other value indicates implementation bug
```

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12.5 Python Validation Script

```
def aroon(highs, lows, period=25):
    """
    highs, lows: OHLC lists
    period: lookback period
    Returns (aroon_up, aroon_down, aroon_osc) — None for first period bars
    """
    n = len(highs)
    au, ad, ao = [None]*n, [None]*n, [None]*n
    for i in range(period, n):
        wh = highs[i-period:i+1]   # period+1 elements
        wl = lows[i-period:i+1]
        max_h = max(wh); min_l = min(wl)
        # Most RECENT (rightmost) high/low — TradingView behavior
        idx_max = max(j for j, v in enumerate(wh) if v == max_h)
        idx_min = max(j for j, v in enumerate(wl) if v == min_l)
        au[i] = round(idx_max / period * 100, 4)
        ad[i] = round(idx_min / period * 100, 4)
        ao[i] = round(au[i] - ad[i], 4)
    return au, ad, ao

# Validation: au[-1] should be a multiple of 100/period
# and identical to TradingView (tolerance 0%)
```

13. Practical Exercises with Complete Answers

Exercise 1: Aroon Up jumps from 0 to 100 — real signal or window edge?

Situation: On 5M, Aroon_Up was 0 for the last 3 bars. Current bar: Aroon_Up = 100, Aroon_Down = 60. Close is +0.3% compared to the previous bar.

Question: Aroon_Up = 100 indicates a strong bullish trend. Do you go Long?

Answer:

NOT immediately — first check if it is a window edge effect.

- **Diagnosis:** Aroon_Up = 0 for 3 bars → Highest High was at the window's edge. Current bar: Aroon_Up = 100 → means the price made a new Highest High on the current bar.
- **But Close +0.3% is modest** — does not correspond to a strong breakout. Check: Is the current bar's High > High of all last 25 bars? If YES with a small margin (e.g., 0.1%) → possibly just a window edge (old High exited the window and current bar marginally exceeded it).

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- **Practical test:** Compare current bar's High with Highs from the last 5 bars — if no significant difference, it is more likely a window edge than a real breakout.
- **Correct action:** Wait 1–2 bars for confirmation: if Aroon_Up remains ≥ 96 on the next bar and price continues up → valid signal. If Aroon_Up drops to 96 or below immediately → confirms current bar did not significantly exceed previous level.

Exercise 2: Aroon_Up = 20, ADX = 35 — tired trend?

Situation: On 1H, ADX = 35 (strong trend). But Aroon_Up = 20 (Highest High 20 bars ago). Aroon_Down = 8 (Lowest Low 23 bars ago). Price has risen by 15% in the last 25 days.

Question: ADX = 35 indicates a strong trend. Aroon = 20 indicates a tired trend. What do you do?

Answer:

Real conflict — existing but temporally tired trend. This is the classic situation of a mature trend.

- **ADX = 35** confirmed: price movements on 1H have been strong over the last ~13 bars (ADX lag). The trend existed and has residual strength.
- **Aroon_Up = 20** warns: price hasn't set a new High for 20 bars on 1H. Last 20 bars = consolidation or decline. The trend is tired in terms of the frequency of new highs.
- **Conclusion:** The trend has lost the momentum to make new highs. ADX does not update as quickly (13-bar lag) → reflects past strength.
- **Correct action:**
- Do not go Long on 1H — tired trend
- Monitor for: Aroon_Up returning to ≥ 70 (new highs on 1H) → re-entry into trend
- Or wait for signals from smaller TF (15M/5M) with Aroon_Up ≥ 70 confirmation

---

Exercise 3: Both Aroon below 30 — deep consolidation

Situation: On 4H, Aroon_Up = 16, Aroon_Down = 24. Oscillator = −8. Choppiness = 70, ADX = 12.

Question: What does this configuration signal?

Answer:

Deep consolidation confirmed on all levels.

- **Aroon_Up = 16** → Highest High 21 bars ago on 4H = ~84 hours ago = ~3.5 days without a new high
- **Aroon_Down = 24** → Lowest Low 19 bars ago = ~76 hours ago = ~3+ days without a new low
- Both below 30 = no active direction
- ADX = 12 < 20 = confirmation

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- Choppiness = 70 > 61.8 = confirmation
- **Conclusion:** BTC/altcoin is stuck in a tight range for ~3.5 days. No directional pressure.
- **Correct action:** Completely skip any signal on 4H and smaller TFs until a confirmed breakout: Aroon_Up or Aroon_Down > 70 with ADX > 18 rising.

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14. Cheat Sheet — Rapid Summary

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Concept	Value / Rule
Formula Aroon Up	`(period − bars_since_HH) / period × 100` = `idx_max / period × 100`
Formula Aroon Down	`(period − bars_since_LL) / period × 100` = `idx_min / period × 100`
Formula Oscillator	`Aroon_Up − Aroon_Down` (range −100 ... +100)
Standard Period	25
Warm-up	period+1 = 26 bars
Smoothing	None — direct calculation
Lag	0 for current extremes; conceptually = bars_since
Aroon = 100	Extreme on the current bar
Aroon = 0	Extreme at the window's edge (period bars ago)
Bull/Bear Threshold	≥ 70 = recently active trend; ≤ 30 = exhausted trend
Strong Bull	Up ≥ 70 AND Down ≤ 30
Strong Bear	Down ≥ 70 AND Up ≤ 30
Consolidation	Both < 50 → skip
Parallelism	Both > 70 → extremely high volatility, no direction
Oscillator > 50	Temporarily solid bullish trend
Oscillator < −50	Temporarily solid bearish trend
Bullish Crossover	Up crosses above Down → bullish change
Bearish Crossover	Down crosses above Up → bearish change
Window Edge Effect	Old extreme exits the window → sudden Aroon jump
Tie-breaking	Most RECENT high (rightmost in window)
Correct Window	`highs[i-period:i+1]` → period+1 elements
Granularity	Values = multiples of 100/period (e.g., 0,4,8,...,100 for period=25)
Aroon vs ADX	Aroon = WHEN; ADX = HOW strong
Optimal Combination	Aroon_Up ≥ 70 + ADX > 20 + EMA stack bullish
Bot vs TV Tolerance	0% (deterministic calculation, no smoothing)
	leftmost vs rightmost tie-breaking

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Concept	Value / Rule
Cause #1 Divergence	
Cause #2 Divergence	window of period bars instead of period+1
MTF Score 4/4	Up ≥ 70 on 4H + 1H + 15M + 5M → entry Long

PSEDYS Aroon Technical Manual v1.0 — May 2026
Covers: complete formula (idx_max/period × 100 = time since extreme), simple check period=5 (Up=60, Down=80 ✓), numeric example 50 bars verified (bar 26: Up=76, Down=4, Osc=72 ✓), discrete granularity (multiples 100/period), Window Edge Effect (sudden jump to 0 when extreme exits window), lag=0, warm-up period+1, full interpretation table 0–100%, classification Strong Bull/Bear/Consolidation/Parallelism, Aroon vs ADX (time vs magnitude), false signals filters, MTF with alignment score, PSEDYS integrated with SQL query, bot vs TradingView validation (rightmost tie-breaking + period+1 window), correct Python script, 3 practical exercises.

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