PSEDYS | TECHNICAL REFERENCE MANUAL V3.0

Stochastic Oscillator — Technical Reference Manual v1.0

PSEDYS | Complete Edition

%K · %D · Fast vs Slow · HH/LL Lookback · OB/OS · Crossover · Divergence · Stoch vs RSI · MTF · Bot vs TradingView

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1. What is Stochastic? Concept and Philosophy

The Stochastic Oscillator was created by George Lane in the 1950s. Unlike RSI, which measures the **speed** of price changes (close vs previous close), Stochastic measures the **position** of the closing price relative to the High-Low range of the last N bars.

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Lane's Philosophy: In an uptrend, the price tends to close near the day's High. In a downtrend, it tends to close near the Low. Stochastic quantifies this property.

Stochastic vs RSI:

Feature	Stochastic	RSI
What it measures	Position of Close relative to H/L range	Speed of Close vs previous Close
Basis	High, Low, Close (range)	Close-to-close changes
Smoothing	SMA for %D	Wilder RMA
Sensitivity	Higher (moved by H/L extremes)	Moderate
False signals	More frequent in trend	Fewer
Ideal for	Timing entry/exit in range	Divergence, trend filter

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2. Calculation Formula — Complete

2.1 %K (Fast Stochastic)

```
%K[i] = (Close[i] − Lowest(Low, K_period)) /
         (Highest(High, K_period) − Lowest(Low, K_period)) × 100

Where window = bars [i−K_period+1 .. i]
```

Interpretation of extremes:

```
%K = 100: Close = Highest High in window (closes at peak)
%K = 0:   Close = Lowest Low in window (closes at bottom)
%K = 50:  Close exactly in the middle of the range
```

Special case HH = LL (zero range — perfect inside bar over N bars):

```
if hh == ll:
    k = 50.0  # or 100.0, depends on implementation — TradingView: 50
```

2.2 %D (Signal Line)

```
%D[i] = SMA(%K, D_period)    ← simple average of the last D_period %K values
```

Standard: D_period = 3. %D is a smoother line than %K.

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2.3 Fast Stochastic vs Slow Stochastic

Variant	%K	%D	Smoothing
Fast	%K raw	SMA(%K, 3)	Minimal
Slow	SMA(%K_raw, 3) = Fast %D	SMA(Slow_%K, 3)	Double
Full	SMA(%K_raw, custom)	SMA(Full_%K, custom)	Configurable

```
Fast Stochastic:
  %K_fast = basic formula (raw)
  %D_fast = SMA(%K_fast, 3)

Slow Stochastic (recommended — fewer false signals):
  %K_slow = %D_fast  (Fast %D becomes Slow %K)
  %D_slow = SMA(%K_slow, 3)
```

TradingView default: Slow Stochastic (implicitly smoothed).

2.4 Complete Numerical Example — period=14, 50 bars

Manual verification bar 14 (first %K):

```
Window bars 1..14:
  HH = max(High[1..14]) = 108.20
  LL = min(Low[1..14])  = 99.45
  Close[14] = 107.67

%K = (107.67 − 99.45) / (108.20 − 99.45) × 100
   = 8.22 / 8.75 × 100 = 93.94  ✓
```

Selection table bars 14–50:

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Bar	Close	%K	%D	Zone
14	107.67	**93.94**	N/A	OB
16	108.25	94.19	94.51	OB
18	109.10	96.18	96.27	OB
24	106.30	12.78	40.11	OS
26	104.44	3.90	7.61	OS
28	104.14	3.15	6.36	OS
34	103.93	18.78	13.78	OS
38	105.67	78.77	59.33	BULL
40	107.65	94.49	88.82	OB
46	111.31	98.14	94.46	OB
50	112.87	94.46	96.75	OB

Detected crossovers:
- Bar 33: Bull Cross %K(14.24) > %D(10.93) — exit from OS zone
- Bar 38–40: %K rises to OB quickly (bullish recovery)

2.5 Alternative Parameters

Variant	%K Period	%D Period	Feature
Standard Fast	**14**	**3**	**PSEDYS default**
Standard Slow	14	3 (× 2)	Double smoothed
Fast scalp	5	3	Very reactive, small TF
Slow macro	21	5	Macro filter large TF

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3. Geometric Logic — Close vs Range

```
%K = 0%   → Close = Low of the day   → market has completely capitulated bearish
%K = 25%  → Close in the lower quarter of the range → bearish bias
%K = 50%  → Close in the middle of the range → equilibrium
%K = 75%  → Close in the upper quarter of the range → bullish bias
%K = 100% → Close = High of the day → market has fully rallied bullish
```

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Why %K captures something different than RSI:
RSI completely ignores where the Close is relative to the bar's range — it only looks at the direction from the previous bar. Stochastic ignores whether the price has risen or fallen compared to previous bars — it only looks at the position of the Close in the recent range.

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4. Lag and Warm-up

```
First %K value:  bar K_period = bar 14 (complete window)
First %D value:  bar K_period + D_period − 1 = bar 16
Warm-up %K:      K_period = 14 bars
Warm-up %D:      K_period + D_period − 1 = 16 bars
Production:      50+ bars
```

Effective lag:
- %K: lag ≈ K_period/2 = 7 bars (center of HH/LL window)
- %D: lag %K + (D_period−1)/2 = 7 + 1 = 8 bars

No Wilder smoothing — Stochastic is based on rolling max/min and simple SMA.

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5. Stochastic Levels — Complete Interpretation

%K / %D	Zone	Meaning
> 80	**Overbought**	Close near HH of the last 14 bars
50–80	Bullish	Close in the upper half of the range
50	**Neutral**	Close exactly in the middle of the range
20–50	Bearish	Close in the lower half of the range
< 20	**Oversold**	Close near LL of the last 14 bars

---

6. Overbought (>80) and Oversold (<20)

Correct usage — same logic as RSI:

```
Stoch > 80 in BEAR context → real overbought → possible Short
Stoch > 80 in BULL context → strong market, can remain >80

Stoch < 20 in BULL context → real oversold → possible Long
Stoch < 20 in BEAR context → weak market, can remain <20
```

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Exit signal from OB/OS:

```
Exit OB: %K drops below 80 → bullish momentum weakens
Exit OS: %K rises above 20 → bearish momentum weakens
```

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7. %K/%D Crossover — Trading Signals

Bullish Cross:

```
%K crosses above %D in OS zone (<20 or <30) → strong Long signal
%K crosses above %D above 50 → bullish continuation
```

Bearish Cross:

```
%D crosses above %K in OB zone (>70 or >80) → strong Short signal
%D crosses above %K below 50 → bearish continuation
```

Crossover strength depends on the zone:

Cross location	Signal strength
%K bullish cross in OS (<20)	Strong
%K bullish cross in neutral (40–60)	Medium
%K bullish cross in OB (>70)	Weak
%D bearish cross in OB (>80)	Strong

Filters for False Crossover:

```
1. Closed candle at crossover (not intra-bar)
2. Cross in relevant zone (OS for Long, OB for Short)
3. ADX > 15 (a minimum of strength)
4. EMA confirmation on the same TF
5. Slow Stochastic (fewer false crosses than Fast)
```

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8. Stochastic Divergence vs Price

Identical to RSI divergences, but Stochastic captures a different perspective (position in range, not speed):

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Bearish: Price HH, Stoch LH → Close no longer reaches the top of the range
Bullish: Price LL, Stoch HL → Close no longer hits the bottom of the range
Hidden Bull: Price HL, Stoch LL → uptrend continuation
Hidden Bear: Price LH, Stoch HH → downtrend continuation

Validation: minimum 15M timeframe, difference > 10 Stoch points, candle confirmation.

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9. Stochastic in Trending Markets

Main issue: Stochastic can remain in OB (>80) for dozens of bars in a strong uptrend and in OS (<20) in a downtrend — similar to RSI.

Stochastic trend zones:

```
Strong uptrend: Stoch maintains 50–100, rarely drops below 40
Strong downtrend: Stoch maintains 0–50, rarely rises above 60
```

Usage in trend:

```
Uptrend (EMA stack bullish + ADX > 25):
→ Do not Short at Stoch > 80 → can remain there
→ Use Stoch < 30–40 as a pullback signal → Long entry

Downtrend (EMA stack bearish + ADX > 25):
→ Do not Long at Stoch < 20 → can remain there
→ Use Stoch > 60–70 as a rally signal → Short entry
```

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10. Stochastic vs RSI — Detailed Comparison

Aspect	Stochastic	RSI
Formula	(Close−LL)/(HH−LL)×100	100−100/(1+AvgGain/AvgLoss)
Basis	Position of Close in H/L range	Speed of Close vs previous Close
Smoothing	SMA (for %D)	Wilder RMA
OB/OS level	80/20	70/30
False signals	More	Fewer
Divergence	Good	Excellent
Failure swings	No	Yes (Wilder concept)
Spike sensitivity	High (H/L extremes)	Moderate
Ideal TF	Any, especially small TF	15M+

Optimal combination:

```
RSI > 50 (macro bullish bias) + Stoch < 30 (local pullback) = optimal Long entry
```

Indicator manual: Stochastic Oscillator — Technical Reference Manual v1.0 Part 2 of 2.

11. Stochastic in Sideways Market

In a sideways market (range), the Stochastic is **more useful than RSI** — it oscillates between 0 and 100 capturing bounces at the range extremes:

```
Stoch < 20 at the lower band of the range → Long (bounce at support)
Stoch > 80 at the upper band of the range → Short (rejection from resistance)
```

Condition: R^2 LRC < 0.4 or Choppiness > 61.8 confirms we are in a range.

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12. Multi-Timeframe Analysis (MTF)

Level	Timeframe	Long Condition
Macro	4H	Stoch > 50 and rising
Meso	1H	Stoch > 40
Micro	15M	Stoch exit OS (<20→>20) or %K cross %D bullish
Entry	5M	%K cross %D bullish in OS or below 50

Standard MTF filter: Stoch 4H > 50 + Stoch 5M exit OS = quality Long entry.

13. PSEDYS — Stochastic as Timing Filter

The Stochastic is ideal for **timing entry** in pullbacks — it identifies the exact moment when the local pullback ends in the context of a trend confirmed by EMA + ADX:

```
entry_long = (
    ema_stack_bullish and        # direction (EMA)
    adx > 18 and                 # strength (ADX)
    stoch_k < 30 and             # local pullback (Stoch)
    stoch_k > stoch_d            # %K surpasses %D (momentum returning)
)
```

```
-- Query open positions with Stoch calculated from GM:
SELECT symbol, direction, entry_price,
       (entry_features->>'adx')::float AS adx,
       (entry_features->>'ema_stack') AS ema_stack
FROM live_positions
WHERE lower(state) != 'closed'
ORDER BY opened_at DESC;
-- Compare with Stoch calculated from GM candles at opened_at
```

14. Bot vs TradingView Validation

Sources of divergence:

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Source	Impact
Exclusive vs inclusive HH/LL window	Major
Fast vs Slow Stochastic (different smoothing)	Major
SMA vs EMA for %D	Moderate
HH=LL: 50 vs 100 or 0	Minor

Checklist:

```
□ %K window: High/Low[i-k_period+1:i+1] → k_period elements
□ HH = max(High window), LL = min(Low window)
□ %D = SMA(%K, d_period) — simple, not EMA
□ TradingView default = Slow Stochastic (smoothed)
□ If TradingView shows differently: check Fast vs Slow
□ Tolerance: < 0.5 points %K
```

Python Script:

```
def stochastic(highs, lows, closes, k_period=14, d_period=3):
    n = len(closes)
    k = [None] * n
    for i in range(k_period - 1, n):
        hh = max(highs[i-k_period+1:i+1])
        ll = min(lows[i-k_period+1:i+1])
        k[i] = (closes[i] - ll) / (hh - ll) * 100 if hh != ll else 50.0
    d = [None] * n
    for i in range(k_period - 1 + d_period - 1, n):
        vals = [k[j] for j in range(i-d_period+1, i+1) if k[j] is not None]
        if len(vals) == d_period:
            d[i] = sum(vals) / d_period
    return k, d   # Fast Stochastic
    # Slow: slow_k = d; slow_d = SMA(slow_k, 3)
```

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15. Practical Exercises with Complete Answers

Exercise 1: Stoch OB in bullish trend — enter Short?

Situation: On 15M, EMA stack bullish, ADX = 30, Stochastic %K = 88, %D = 85 (OB). MACD positive.

Answer: NO — Stoch OB in a bullish trend is not a Short signal. Close near HH of the last 14 bars = active trend. Maintain Long or wait for a pullback to Stoch < 40 for entry.

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Exercise 2: %K cross %D in OS — valid entry?

Situation: On 5M, %K = 22 crosses above %D = 18 (Bull cross in OS). EMA 200 4H < price. ADX = 21. Closed candle confirmed.

Answer: Yes — valid Long entry. Cross in OS (<20) + macro bullish context + ADX > 18 = quality signal. SL below the last Low. TP at %K = 50 (first target) or %K = 80.

Exercise 3: Bullish Stochastic Divergence on 1H

Situation: Price makes LL (102 vs 105 previous). Stoch HL (22 vs 8 previous). ADX = 18.

Answer: Attention signal — not immediate entry. Bullish divergence confirms bearish exhaustion. Wait for %K > 20 (exit OS) + closed candle above the previous Low → Long entry with SL below the new LL.

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16. Cheat Sheet — Quick Summary

Concept	Value / Rule
%K Formula	`(Close − LL(K_period)) / (HH(K_period) − LL(K_period)) × 100`
%D Formula	`SMA(%K, D_period)`
Slow %K	`= Fast %D`
Slow %D	`= SMA(Slow %K, 3)`
Standard Parameters	K=14, D=3
Warm-up %K	14 bars
Warm-up %D	16 bars
OB	> 80
OS	< 20
Neutral	50
Bull cross	%K > %D in OS → Long
Bear cross	%D > %K in OB → Short
Exit OB	%K drops below 80 → weakening bullish
Exit OS	%K rises above 20 → weakening bearish
Fast vs Slow	TradingView default = Slow (double smoothed)
HH=LL	%K = 50 (TradingView)
Stoch vs RSI	Stoch = position in range; RSI = close/close speed
Ideal for	Timing entry in pullbacks (confirmed trend)
Sideways	Stoch OB/OS at range extremes = more reliable
Cause #1 TV divergence	Incorrect Fast vs Slow Stochastic chosen

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