

# Sequence Complexity Trend Shift

Expert Advisor Documentation

## PLATFORM

MetaTrader 5 (MT5)

## TYPE

Trend / Regime Transition

## TIMEFRAME

H1 – H4 (adaptive)

## WEBSITE

[www.algobot.live](http://www.algobot.live)

**⚠ Important Disclaimer** This document is for educational and informational purposes only. It does not constitute financial or investment advice. Trading forex, CFDs, and other leveraged instruments involves substantial risk of loss and is not suitable for all investors. Past backtest performance does not guarantee future results. Never trade with capital you cannot afford to lose.

## Overview

**Sequence Complexity Trend Shift** is a regime-transition trend system built on an idea borrowed from information theory: the **Lempel-Ziv complexity (LZ76)** of the market's recent up/down pattern. Instead of measuring price, momentum, or volatility, it measures how *compressible* — that is, how predictable — the sequence of recent close-to-close direction changes has become.

Over a rolling window of **Window** bars, each bar is reduced to a single bit: **1** if it closed up, **0** if it closed down. The resulting binary string is parsed with the classic Lempel-Ziv dictionary algorithm, which counts the number of distinct "phrases" needed to describe it. That phrase count is normalised toward the expectation of a purely random source:

$$\text{LZnorm} = c \cdot \log_2(N) / N \quad \left( \approx 1.0 \text{ for a coin-flip series,} \right. \\ \left. \text{markedly lower for a structured one} \right)$$

The interpretation is intuitive:

- **High LZnorm ( $\approx 1$ )** — the up/down pattern is incompressible, a coin-flip. This is directionless **chop** where every bar is a fresh guess.
- **Low LZnorm** — the pattern is repetitive and compressible, so a genuine **structure** has crystallised. A persistent run of same-signed closes is the most compressible pattern of all.

Because complexity is completely independent of price scale and volatility, it reads the same on any symbol or timeframe. But complexity alone cannot distinguish a trend from a tidy two-bar oscillation (a perfect `0101...` alternation is also highly compressible). The system therefore pairs the complexity read with a **net sign bias** and an **EMA direction gate** so that only a compressed sequence that *also* leans decisively one way — and is confirmed by price — is treated as a trend.

**The core idea:** the edge is captured on the *transition*, not the state. The strategy fires on the exact bar where `LZnorm` first **collapses** from the random band down through the threshold — the moment order crystallises out of noise, marking the birth of a directional leg.

## How It Works

---

### 1. Building the return-sign sequence

On each newly completed bar the EA takes the most recent `Window + 1` closes and converts each consecutive change into a bit (up → 1, down → 0). While doing so it also tallies the number of up-bars and down-bars to compute a directional bias:

```
bias = (upBars - downBars) / Window
```

A bias near `0` means the window is balanced (no net direction); a bias approaching `±1` means one side dominates.

### 2. Measuring complexity

The binary string is parsed with the Lempel-Ziv (LZ76) dictionary scan, counting distinct phrases, and normalised into `LZnorm`. This value sits near `1.0` when the recent pattern behaves like random noise and drops well below it once a repetitive, structured pattern forms.

### 3. Entry — the fresh collapse

An entry is only considered on the bar where complexity **freshly collapses** out of the random band: the previous bar's `LZnorm` was at or above `MaxComplexity`, and this bar's `LZnorm` has dropped below it. When that collapse occurs, two confirmations must also agree:

- **Long:** the fresh collapse fires, net bias is positive beyond `MinBias`, and the close is above the EMA.
- **Short:** the fresh collapse fires, net bias is negative beyond `MinBias`, and the close is below the EMA.

The logic is fully symmetric for longs and shorts, and only one position per Magic number is held at any time — the system never stacks.

### Worked example (long)

Over the last 40 bars `LZnorm` had been hovering at 0.97 (near-random chop). On the current bar it drops to 0.81, below the 0.85 threshold — a fresh collapse. The window shows 26 up-bars vs 14 down-bars, so bias = +0.30 (well beyond a 0.10 minimum), and price is trading above the 50-EMA. All three conditions align → the EA opens a long with ATR-based stop and target.

## 4. Exit logic

Positions are protected by a fixed ATR bracket set at entry, plus an early regime-failure exit:

- **Stop loss:** entry price  $\mp \text{AtrStopMult} \times \text{ATR}$ .
- **Take profit:** entry price  $\pm \text{AtrTargetMult} \times \text{ATR}$ .
- **Early regime-failure exit:** if `LZnorm` climbs back above `MaxComplexity × ExitCplxMult`, the sequence has dissolved back into an unpredictable coin-flip — the leg is judged over and the position is closed immediately, without waiting for the stop or target.

**Why the early exit matters:** a trend is defined here as *ordered* price behaviour. The instant that order dissolves back into noise, the premise of the trade no longer holds — so the EA steps aside rather than giving back open profit to random churn.

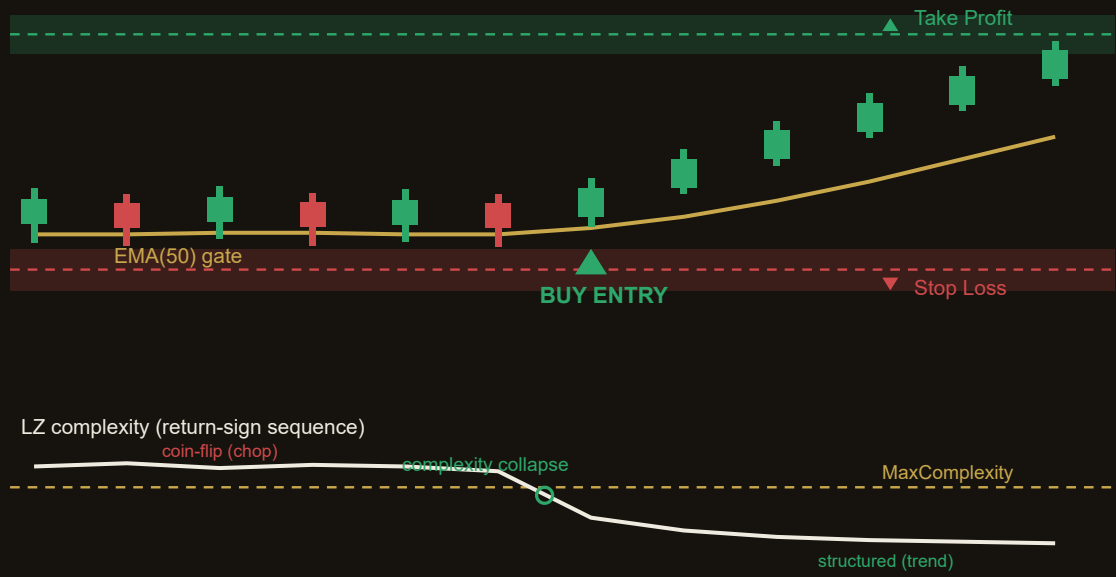
## 5. Timeframe handling

The strategy runs on a single timeframe. Every bar reference uses the chart's own period, so the system adapts to whatever timeframe the backtest or live chart selects — nothing is hardcoded.

## Strategy in Action

---

The illustration below shows an example of how the strategy identifies a setup and triggers its entry and exit. This is a simplified, illustrative example for educational purposes — not real market data.



*Illustrative example only. Actual market behaviour varies.*

## Parameters

| Parameter     | Default | Description                                                                                                                         |
|---------------|---------|-------------------------------------------------------------------------------------------------------------------------------------|
| Window        | 40      | Rolling window (bars) the return-sign sequence and complexity are built on. Range 20–90, step 5.                                    |
| MaxComplexity | 0.85    | Normalised LZ level; below it the sequence is judged "structured". Values near 1.0 mean coin-flip chop. Range 0.55–1.10, step 0.05. |
| MinBias       | 0.10    | Minimum <code> up-down /N</code> net sign bias required to call a direction. Range 0.00–0.40, step 0.05.                            |
| EmaPeriod     | 50      | EMA length used as the price-direction confirmation gate. Range 10–100, step 5.                                                     |
| ExitCplxMult  | 1.05    | Early-exit level: close when <code>LZnorm</code> climbs back above <code>MaxComplexity × this</code> . Range 1.00–1.50, step 0.05.  |
| AtrPeriod     | 14      | ATR period used to size the stop and target. Range 7–40, step 1.                                                                    |
| AtrStopMult   | 2.0     | ATR multiplier for the stop-loss distance. Range 1.0–5.0, step 0.25.                                                                |
| AtrTargetMult | 3.0     | ATR multiplier for the take-profit distance. Range 1.0–8.0, step 0.25.                                                              |
| Lots          | 0.10    | Order volume in lots. Range 0.01–1.0, step 0.01.                                                                                    |
| Magic         | 8419    | Magic number identifying this EA's positions. One position per Magic at a time.                                                     |

## Recommended Settings

The defaults are a balanced starting point for a liquid FX major on an intraday-to-swing timeframe. Consider the following when tuning:

- **Timeframe:** H1 to H4 work well — long enough for the sign sequence to carry meaningful structure, short enough to catch fresh legs. The strategy adapts to whatever period the chart is set to.
- **Window:** shorter windows (20–30) react faster and fire more often but are noisier; longer windows (60–90) demand more sustained structure before signalling.
- **MaxComplexity:** lower it (e.g. 0.75) to demand cleaner, more compressible structure and take fewer, higher-conviction trades; raise it to loosen the filter.
- **MinBias:** increase toward 0.20–0.30 to require a stronger directional lean and reject two-sided compression; keep near 0.10 for more signals.
- **ATR bracket:** the default 2.0 / 3.0 stop/target gives a 1.5:1 reward-to-risk. Widen the target on strongly trending instruments; tighten the stop on ranging ones.

**Tip:** because complexity is scale- and volatility-independent, the same `Window`, `MaxComplexity` and `MinBias` settings tend to transfer across symbols. Re-optimize the ATR bracket per instrument rather than the complexity filter itself.

**Always validate before live use.** Run the EA in the MT5 Strategy Tester across multiple symbols and market regimes, then forward-test on a demo account before committing real capital. Confirm the chosen timeframe provides enough history for the window plus ATR warm-up.

## How to Install on MetaTrader 5

- 1 Copy `SequenceComplexityTrendShift.ex5` to your MT5 `MQL5\Experts\` folder
- 2 Restart MetaTrader 5 and refresh the Navigator panel
- 3 Drag the EA onto a chart matching the recommended symbol and timeframe
- 4 Configure the input parameters and click **OK**
- 5 Enable **Algo Trading** in the MT5 toolbar

## Risk Warning

Trading foreign exchange, CFDs, and other leveraged financial instruments involves substantial risk of loss and is not suitable for all investors. The strategies and tools described in this document are provided for **educational purposes only** and do not constitute financial advice, investment recommendations, or solicitation to trade. Always consult a qualified financial adviser before making trading decisions. Past backtest performance is not indicative of future results.