Algobot
Maximize Your Profits

Dispersion Scaling Rotation

Expert Advisor Documentation

PLATFORM	TYPE	TIMEFRAME	WEBSITE
MetaTrader 5 (MT5)	Adaptive Regime Rotation	M15 – H1 (configurable)	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

Dispersion Scaling Rotation treats price not as a chart to be read, but as a physical particle drifting through a medium. Taking the log of each closing price as the particle's position, the EA measures how far that particle typically travels over a range of time lags — its *mean-squared displacement* — and reads the single number that governs how displacement grows with time: the anomalous-diffusion exponent, `α` (alpha).

In a pure random walk, displacement grows exactly in proportion to elapsed time (`α = 1`). Real order flow bends that law. When `α > 1` the market is **super-diffusive** — moves compound on themselves, order flow is self-reinforcing, and price behaves ballistically (a trend). When `α < 1` it is **sub-diffusive** — moves are suppressed, order flow is self-correcting, and price is effectively caged (mean-reverting). Around `α = 1` there is no exploitable structure, so the EA stands aside.

The strategy then **rotates a single engine between two opposite behaviours** according to the measured regime: it trends *with* the drift when the medium is ballistic, and fades statistical extremes when the medium is caged. It does not assume a fixed edge — it self-adapts to the diffusion character it actually measures.

> **First-principles design.** The `α` exponent is derived purely from raw OHLC data — there are no classic indicators, price-action patterns, or published methodologies involved. Because `α` is fitted across *several* time lags at once (τ = 1, 2, 4, 8), it is a genuine multi-scale self-similarity measure, mathematically distinct from a one-step autocorrelation, an efficiency ratio, or a symbolic entropy.

How It Works

1. Measuring the diffusion exponent (α)

On each newly-closed bar the EA collects the last `Window` log-price displacements at four lags, τ ∈ {1, 2, 4, 8}, and computes the mean-squared displacement (MSD) at each lag:

```
MSD(τ)  =  ⟨ ( ln Close[t] − ln Close[t−τ] )² ⟩
```

Because MSD is expected to scale as $MSD(\tau) \sim \tau^{\alpha}$, taking logs turns the relationship into a straight line. The EA runs an ordinary least-squares fit of `ln MSD(τ)` against `ln τ`; **the slope of that line is α**. Degenerate cases (a flat window, or a singular fit) are rejected and the bar is skipped.

2. Classifying the regime

A neutral half-band, `ScalingBand`, sits around `α = 1` to suppress noise:

- **Super-diffusive (trend):** `α ≥ 1 + ScalingBand` — ride the drift.
- **Sub-diffusive (revert):** `α ≤ 1 − ScalingBand` — fade the extreme.
- **Random walk:** anything inside the band — no position.

3. Entry logic — one signal, rotated by the regime

Super-diffusive → trade WITH the drift. The net displacement over the last `DriftSpan` bars must clear `DriftAtrFrac × ATR`. This confirms a real ballistic move rather than microstructure noise. The EA then buys if the drift is up, sells if it is down.

Sub-diffusive → trade AGAINST a statistical extreme. The latest close is standardised against the window's mean and standard deviation to form a z-score. If `z ≥ RevertZScore` the particle is stretched high and is faded *short*; if `z ≤ −RevertZScore` it is stretched low and faded *long*, expecting a snap-back to the cage centre.

4. Dynamic risk — reward scales with the measured exponent

The stop is always volatility-adaptive: `Stop = AtrSlMult × ATR`. The reward-to-risk multiple (`rr`) is a function of `α`:

- **Trend targets widen with conviction:** `rr = clamp(1.2 + 2.0 × (α − 1), 1.2, 3.0)`. The more super-diffusive the medium, the further the ballistic run is expected to travel.
- **Revert targets tighten:** `rr = clamp(1.3 − 2.0 × (1 − α), 0.6, 1.3)`. A snappier cage is expected to reach the centre quickly, so the take-profit is pulled in.

Take-profit distance is then simply `Stop × rr`, placed the correct side of entry.

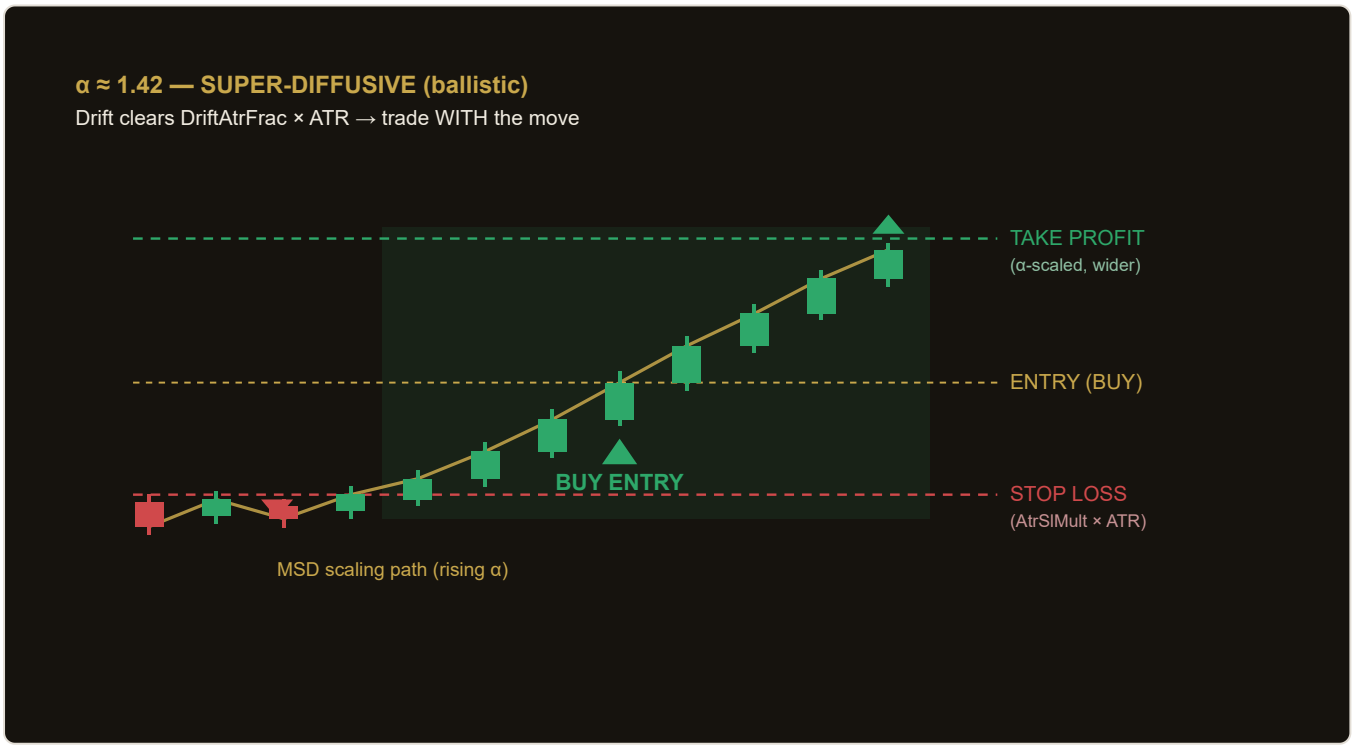
5. Adaptive regime-flip exit

If a position is open and the live regime now argues for the *opposite* direction (the desired side flips against the held side), the position is closed immediately — the diffusion picture no longer supports it. Otherwise the position is left to its stop-loss and take-profit. Only one position per symbol is held at a time.

> **Bar-close processing.** All computation runs once per newly-closed bar (detected by a change in the forming bar's timestamp). The EA needs roughly `Window + max(DriftSpan, AtrPeriod, 8) + 3` bars of history before it begins trading, so allow a warm-up period after attaching it to a chart.

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.

Worked example (super-diffusive)

The fit returns `α = 1.42` with `ScalingBand = 0.15`, so `α ≥ 1.15` → ballistic regime. The net move over the last `DriftSpan = 4` bars is +18 pips and ATR is 40 pips, so the drift (18) exceeds `DriftAtrFrac × ATR = 0.30 × 40 = 12` — a valid up-drift. The EA buys. With `AtrSlMult = 2.0` the stop is 80 pips; `rr = clamp(1.2 + 2.0 × 0.42, 1.2, 3.0) = 2.04`, so the take-profit sits ~163 pips above entry. If a later bar measures a sub-diffusive down-fade, the long is closed on the regime flip.

Parameters

Parameter	Default	Description
Window	`60`	Analysis window, in bars, over which MSD(τ) and the z-score are measured. Range 32–160, step 4.
ScalingBand	`0.15`	Neutral half-band around α = 1; `|α − 1|` must exceed it before the EA acts. Range 0.03–0.5, step 0.01.
DriftSpan	`4`	Number of bars spanned by the net-displacement (drift) used in the trend regime. Range 1–20, step 1.
DriftAtrFrac	`0.30`	Drift must exceed this fraction of ATR to count as a ballistic move. Range 0.0–2.0, step 0.05.
RevertZScore	`1.20`	Z-score extreme required to fade price in the sub-diffusive (revert) regime. Range 0.5–3.0, step 0.1.
AtrPeriod	`14`	Averaging period for the ATR used to size stops and the drift threshold. Range 7–40, step 1.
AtrSlMult	`2.0`	Stop-loss distance as a multiple of ATR (`Stop = AtrSlMult × ATR`). Range 0.8–5.0, step 0.1.
Lots	`0.10`	Fixed lot size for each order. Range 0.01–1.0, step 0.05.
Magic	`40727`	Magic number identifying this EA's positions so it manages only its own trades.

Recommended Settings

The defaults are a balanced starting point tuned for liquid instruments where a diffusion picture of price is meaningful — major FX pairs, metals, indices, and liquid crypto. Because the EA measures dispersion in a scale-free way, it runs on whatever single timeframe you attach it to.

- **Instruments:** liquid FX majors (EURUSD, GBPUSD), metals (XAUUSD), major indices, or liquid crypto.
- **Timeframe:** M15 to H1 is a sensible starting range; higher timeframes reduce noise in the α fit but trade less often.
- **Window:** keep near the 60 default; larger windows give a steadier α but react more slowly to regime change.
- **ScalingBand:** raise it to trade only strongly-classified regimes (fewer, cleaner signals); lower it to act sooner.
- **Risk:** adjust `Lots` and `AtrSlMult` to your account size; the ATR-based stop already adapts the absolute risk to current volatility.

> **Tip.** Always validate any parameter set in the MT5 Strategy Tester across several market conditions before going live, and confirm the EA's warm-up requirement is met (roughly `Window + max(DriftSpan, AtrPeriod, 8) + 3` bars) so it begins evaluating regimes promptly.

How to Install on MetaTrader 5

1. Copy `DispersionScalingRotation.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.