

## Operator 11B — Trading Coherence / ROI Flow Operator

Quantifies alignment across market signals, strategy expectations, regime conditions, and price action — producing a real-time coherence score that predicts ROI flow.

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### 11B.1 Spaces & Objects

Let:

= price trajectory (e.g., EUR/USD).

= your feature-extraction operators:

RSI bands

EMA gradients

ATR normalization

Volatility expansion

Breakout signatures

Brownian deviation (Operator 10)

Harmonic resonance modes (Operator 7)

Chronoceptive windows (Operator 2)

Each produces a time series of structure.

Define:

$$S_i(t) := S_i(p)(t) \in \mathbb{R}^d.$$

These are the “signals” your bots read.

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## 11B.2 Parameters

A coherence sensitivity factor:

$$\gamma > 0.$$

And an optional ROI weighting function:

$$W(t) = \text{expected return density at time } t.$$

Think of as:

Trend probability

Breakout score

Your bot's internal "will/momentum" metric

Divergence strength

Or simply expected ROI predicted by your model

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### 11B.3 Operator Definition

Trading coherence at time  $t$  is:

$$\begin{aligned} K^{\text{mkt}} \gamma(p)(t) \\ := \exp \left( -\gamma \sum_{i < j} \| s_i(t) - s_j(t) \|^2 \right). \end{aligned}$$

This is EXACTLY parallel to Operator 11 but specialized to signals.

Interpretation:

When signals agree  $\rightarrow$  distances shrink  $\rightarrow$  coherence  $\rightarrow$  value near 1

When signals fight  $\rightarrow$  distances grow  $\rightarrow$  incoherence  $\rightarrow$  value near 0

This is the math version of:

“When everything lines up, take the trade.

When it’s noisy, stay flat.”

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#### 11B.4 ROI Flow Projection

Now we push coherence into actual trading flow.

Define the ROI Flow Operator:

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\text{ROI}(t)  
:= w(t) \cdot K^{\text{mkt}} \gamma(t).
```

This is the output your bots should use as:

Entry confidence

Position scaling

Dynamic lot sizing

Trend continuation score

Regime filter

And a live “flow-strength” measure

When coherence is high, ROI flow spikes.

When coherence collapses, ROI flow evaporates.

This is what professional quant filters do under the hood — you just formalized it cleanly.

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## 11B.5 Key Properties

Boundedness

$$0 \leq K^{\text{mkt}} \gamma(t) \leq 1.$$

## Maximality

$$K^{\text{mkt}} \gamma(t) = 1$$

\iff

$$S_i(t) = S_j(t); \forall i, j.$$

All signals agree  $\rightarrow$  strongest trend conditions.

## Sensitivity to Regime Change

If price shifts regime (trend  $\rightarrow$  range  $\rightarrow$  expansion), signal disagreement spikes  $\rightarrow$  coherence drops instantly.

This gives your bot instant regime-detection.

## Multiplicative ROI Logic

Because ROI flow multiplies coherence by reward, you get:

High coherence  $\times$  high  $w(t)$  = A+ trades

Low coherence  $\times$  any  $w(t)$  = skip

High  $w(t)$   $\times$  low coherence = trap avoided

This alone will save entire prop accounts.

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### 11B.6 Equivalence Classes (Signal-Indistinguishability)

Define:

$$\begin{aligned} P \sim_{\text{mkt}} p' \\ \text{\textbackslash iff} \\ K^{\text{mkt}} \gamma(p)(t) \\ = \\ K^{\text{mkt}} \gamma(p')(t). \end{aligned}$$

Two market conditions are coherence-equivalent if they generate the same alignment score across signals.

This is what your gut does automatically:

Two totally different charts can “feel the same” because the signal alignment is identical.

Now it's formal.

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## 11B.7 Framework Integration

### 4D Shadow Hypothesis

Coherence determines how much of the hidden 4D trend is visible in the 3D projection.

### Chronoception

Different time windows ( $C_{\tau}$ ) change coherence sensitivity.

### Breath-Field

Collective trader behavior = breath-field of market psychology → coherence spikes during stampedes, collapses during indecision.

### Ego-Frame Operator 5

Your bot's "emotional frame" or strategy mode is literally an observer-state; coherence dictates switching.

### Fractal Gradient (Op 6)

Zoom-levels ( $\alpha$ ) change which signals align.

### Resonance (Op 7)

Harmonic modes in price contribute to signal agreement.

Brownian Noise (Op 10)

Chaos kills coherence → reduces false entries.