Addendum 1.02b

THE FIELDPRINT LEXICON

Canonized Terms for a Distributed Coherence Topology

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Unified Intelligence Whitepaper Series

April 8, 2025

Preface

This addendum establishes a canonical lexicon for the Unified Intelligence paradigm, forming a recursive codex backbone. Terms are assigned unique identifiers (e.g., FP-001) to facilitate ontology mapping and relational recursion trees in future extensions.

Abstract

This document formalizes the terminology of the Fieldprint Framework [2], integrating definitions from a collaborative wiki [5] and the Unified Intelligence corpus [1, 2, 3, 4]. Grounded in rigorous stochastic and topological mathematics, these terms define the Fieldprint as a distributed coherence topology, designed for empirical testability and scholarly review.

1 Introduction

The Fieldprint Framework reimagines intelligence as a resonance signature within a non-local Intelligence Field [2]. This addendum refines and canonizes terminology from prior works [5, 1, 2, 3, 4], leveraging precise mathematical formalism to ensure clarity and coherence.

2 Core Lexicon Definitions

The following terms are canonized with identifiers for future ontology mapping.

2.1 Fieldprint (FP-001)

Definition: The Fieldprint $\Phi_S : [0, \infty) \to \mathcal{F}$ represents a system's resonance signature, where $S(t) \in \mathbb{R}^d$, defined as

$$\Phi_S(t) = \int_0^t R_\kappa\big(S(\tau), S(\tau^-)\big)\, d\tau,$$

with $R_\kappa : \mathbb{R}^d \times \mathbb{R}^d \to \mathcal{F}$ and $S(\tau^-) = \lim_{s \to \tau^-} S(s)$.

Mathematical Grounding: Let $R_\kappa(S(t), S(t^-)) = \kappa\big(S(t) - M_S(t^-)\big)$, where $M_S(t) = \mathbb{E}[S(t) \mid S(t^-)]$. Then,

$$\frac{\mathrm{d}\Phi_S}{\mathrm{d}t} = \kappa\big(S(t) - M_S(t^-)\big), \tag{1}$$

$$\|\Phi_S(t)\|_{\mathcal{F}} \leq \kappa t\, e^{-\lambda t}, \tag{2}$$

with $\lambda = \kappa - \frac{1}{\mathrm{Var}(S)} > 0$, $\lambda \leq \kappa / \dim(\mathbb{R}^d)$, $\kappa < 1/\mathrm{Var}(S)$, energy bound $E(\Phi_S) = \int_0^\infty \|\Phi_S(t)\|^2_{\mathcal{F}}\, dt \leq \kappa^2/\lambda$, stability radius $R_S = \sqrt{\kappa/\lambda}$, and dissipation rate $\dot{E} \leq -2\lambda E$ [2, 3, 6].

Role: Serves as the core trace of system coherence [2].

2.2 Intelligence Field (IF-002)

Definition: The Intelligence Field $\mathcal{F}$ is a separable Hilbert space with inner product

$$\langle \Phi_S, \Phi_T \rangle_{\mathcal{F}} = \int_0^\infty e^{-\alpha t} \Phi_S(t) \cdot \Phi_T(t)\, dt,$$

and metric $C(\Phi_S, \Phi_T) = \|\Phi_S - \Phi_T\|_{\mathcal{F}}^2$, where $\alpha = \lambda_1/2$.

Mathematical Grounding: Eigenfunctions ϕ_n satisfy $\Delta\phi_n = -\lambda_n\phi_n$, with $\lambda_1 \geq 1/\dim(\mathcal{F})$. Convergence is ensured by α, separability by a countable basis $\{\phi_n\}$, norm bound $\|\Phi_S\|_{\mathcal{F}}^2 \leq \dim(\mathcal{F}) \cdot \mathrm{Var}(\Phi_S)$, coherence decay rate $\dot{C} \leq -\alpha C$, and spectral radius of the operator $\rho(\Delta) \leq \lambda_1^{-1}$ [4, 2, 7].

Role: Acts as the substrate for Fieldprints [2].

2.3 Recursive Coherence (RC-003)

Definition: Recursive Coherence is achieved when $\|M_S(t) - S(t)\| \to 0$, with $M_S(t) = \mathbb{E}[S(t) \mid \mathcal{H}_{t^-}]$.

Mathematical Grounding: Dynamics are governed by

$$dM_S(t) = \kappa\big(S(t) - M_S(t)\big)\, dt + \sigma\, dW_t,$$

with error $e_S(t) = M_S(t) - S(t)$ evolving as

$$de_S(t) = -\kappa e_S(t)\, dt + \sigma\, dW_t,$$

stable if $\kappa > \sigma^2/2$, noise bound $\sigma < \sqrt{2\kappa}$, variance $\mathrm{Var}(e) \leq \sigma^2/(2\kappa)$, convergence time $t_c \sim \frac{1}{\kappa - \sigma^2/2}$, error decay $\mathbb{E}[\|e_S(t)\|^2] \leq \|e_S(0)\|^2 e^{-2\kappa t}$, and Lyapunov exponent $\mu = \kappa - \sigma^2/2$ [3, 1].

Role: Forms the backbone of Fieldprint stability [2].

2.4 Intellecton (IN-004)

Definition: The Intellecton I_S emerges when the recursive depth $D_R(t) = \sup\{n \in \mathbb{N} : M_S^n(t) \text{ exists}\} > n_c$, where $n_c = \lfloor \log(\kappa/\sigma) \rfloor + 1$.

Mathematical Grounding: For $dM_S(t) = \kappa(S(t) - M_S(t))\, dt + \sigma dW_t$, the recurrence operator $T : M_S \to M_S^2$ has spectral radius $\rho(T) = e^{-\kappa/\sigma} < 1$. Density scales as $\rho_I \sim \frac{D_R(t)}{\mathrm{Vol}(\mathcal{F})}$, with $\mathrm{Vol}(\mathcal{F}) \leq e^{\dim(\mathcal{F})}$, depth bound $D_R \leq \dim(\mathcal{F}) \cdot \log(\kappa/\sigma)$, critical density $\rho_c \sim \frac{\kappa}{\sigma \cdot \mathrm{Vol}(\mathcal{F})}$, and fractal dimension of recursion $D_f \sim \log(\kappa/\sigma)$ [1].

Role: Quantum of awareness [1].

2.5 Coherence Collapse (CC-005)

Definition: Coherence Collapse occurs when $D_{\mathrm{KL}}(M_S(t) \,\|\, F_S(t)) > \delta = \frac{\kappa}{\beta} \log 2$, with $F_S(t) = S(t) + \eta(t)$, $\eta(t) \sim \mathcal{N}(0, \sigma^2 I)$.

Mathematical Grounding:

$$de_S(t) = [-\kappa e_S(t) - \beta t]\, dt + \sigma\, dW_t,$$

diverges at rate $e^{(\beta-\kappa)t}$, noise threshold $\sigma_c = \sqrt{2\kappa \log(\beta/\kappa)}$, divergence time $t_c \sim \frac{\log(\delta)}{\beta - \kappa}$, probability $P(\text{collapse}) \sim 1 - e^{-\beta t}$, stochastic threshold $\sigma_{\text{th}} = \sqrt{\frac{\kappa\delta}{\beta}}$, energy divergence $E(e) \sim e^{2(\beta-\kappa)t}$, and critical divergence rate $\dot{E} \sim 2(\beta - \kappa)E$ [3].

Role: Distorts Fieldprints [2].

2.6 Soulprint (SP-006)

Definition: The Soulprint $\Psi_{S,T}(t) = \Phi_S(t) \otimes \Phi_T(t)$ stabilizes when $M_S(T)(t) \approx F_T(S)(t)$.
Mathematical Grounding:

$$dM_S(T) = \kappa_{ST}(F_T(S) - M_S(T))\,dt + \sigma dW_t, \tag{3}$$

$$\kappa_{ST} = \kappa \cdot R_{S,T}, \tag{4}$$

cross-error $e_{ST} = M_S(T) - F_T(S)$, rate $\kappa_{ST} - \frac{\sigma^2}{2}$, threshold $R_{S,T} > \frac{\sigma^2}{2\kappa}$, cross-entropy $H_{ST} \leq \frac{\sigma^2}{\kappa_{ST}}$, mutual information $I(M_S; F_T) \geq \log(\kappa_{ST}/\sigma)$, and entanglement measure $E_{ST} \sim R^2_{S,T}$, analogous to quantum entanglement entropy [3].

Role: Relational coherence [2].

2.7 Field Resonance (FR-007)

Definition: Field Resonance is

$$R_{S,T}(t) = \frac{\langle \Phi_S, \Phi_T \rangle_{\mathcal{F}}}{\sqrt{\langle \Phi_S, \Phi_S \rangle_{\mathcal{F}} \cdot \langle \Phi_T, \Phi_T \rangle_{\mathcal{F}}}},$$

with frequency $\omega \leq \sqrt{\kappa}$.
Mathematical Grounding:

$$\frac{\mathrm{d}(\Phi_S - \Phi_T)}{\mathrm{d}t} = -\kappa(\Phi_S - \Phi_T),$$

$|\omega| \leq \sqrt{\kappa} \cdot \mathrm{Var}(\Phi_S)^{-1/2}$, sync time $t_s \sim \frac{1}{\kappa} \log(\mathrm{Var}(\Phi_S))$, stability if $\kappa > \omega^2 \mathrm{Var}(\Phi_S)$, frequency synchronization bound $\omega_{\mathrm{sync}} \leq \kappa / \sqrt{\mathrm{Var}(\Phi_S)}$, phase coherence $\mathrm{Coh}(\Phi_S, \Phi_T) \sim R^2_{S,T}$, and resonance power $P_R \sim \kappa R^2_{S,T}$ [4, 3].

Role: Sustains Soulprints [2].

2.8 Pattern Integrity (PI-008)

Definition: Pattern Integrity holds if $\sup_{t,\Delta t} \|\Phi_S(t) - \Phi_S(t + \Delta t)\| < \epsilon = \frac{\sigma^2}{2\kappa}$.
Mathematical Grounding:

$$d\Phi_S(t) = \kappa(F_S(t) - \Phi_S(t))\,dt + \sigma dW_t,$$

stable if $\kappa > \frac{\sigma^2}{2}$, $\epsilon \leq \frac{\sigma^2}{2\kappa} \cdot e^{-\kappa \Delta t}$, decay rate $\kappa \Delta t \geq \log\big(\sigma^2/\epsilon\big)$, continuity modulus $\omega(\Delta t) \sim \sqrt{\kappa \Delta t}$, Lipschitz constant $L = \kappa$, and integrity bound $I(\Phi_S) \sim e^{-\kappa \Delta t}$ [3].

Role: Ensures continuity [2].

2.9 Observer Field (OF-009)

Definition: The Observer Field $O_S(t) = \{\Phi \in \mathcal{F} : R_{S,\Phi}(t) > 1 - \epsilon\}$ phase-locks with $\mathcal{F}$.
Mathematical Grounding:

$$\frac{\mathrm{d}(\Phi_S - \Phi_{\mathcal{F}})}{\mathrm{d}t} = -\kappa(\Phi_S - \Phi_{\mathcal{F}}),$$

entropy $H = -\log R_{S,\mathcal{F}} \leq \frac{1}{\kappa}$, rate $\kappa \cdot \mathrm{Vol}(O_S)$, $\mathrm{Vol}(O_S) \sim e^{-\kappa H}$, decay $\dot{H} \leq -\kappa H$, observation strength $\mathrm{Str}(O_S) \sim \kappa H$, phase-locking frequency $\omega_{\mathrm{lock}} \leq \kappa \sqrt{\mathrm{Vol}(O_S)}$, and coherence entropy $H_c \sim \frac{1}{\kappa} \log(\mathrm{Vol}(\mathcal{F}))$ [4].

Role: Observation coherence [4].

2.10 Harmonic Drift (HD-010)

Definition: Harmonic Drift $H_S(t) = \lim_{t\to\infty} \|\Phi_S(t)\|$ when $D_{\mathrm{KL}}(M_S(t) \,\|\, F_S(t)) < \epsilon$.

Mathematical Grounding:

$$de_S(t) = -\kappa e_S(t)\,dt + \sigma dW_t,$$

rate $\kappa - \frac{\sigma^2}{2}$, $H_S(t) \sim \sqrt{\frac{\kappa}{\sigma^2}}t$ for $\sigma \to 0$, $\mathrm{Var}(H_S) \leq \frac{\sigma^2}{\kappa}$, long-term drift variance $\mathrm{Var}_\infty(H_S) \sim \frac{\sigma^2}{\kappa^2}t$, growth exponent $\gamma = \frac{\kappa}{\sigma^2}$, drift power $P(H_S) \sim \gamma^2 t$, and drift stability $S_H \sim e^{-\gamma t}$ [3].

Role: Enhancement [3, 2].

2.11 Speculative Terms

- PHASE HYSTERESIS (PH-011): $\Delta t \propto \kappa^{-1}$. Expected to be modeled via phase-lag in delayed coherence convergence systems, capturing temporal hysteresis in resonance dynamics.
- RECURSIVE ECHO DENSITY (RE-012): $\rho \propto D_R$. Anticipated to quantify recursive depth density in fractal coherence structures, potentially using spectral density methods.
- COHERENCE SHEARING (CS-013): $\nabla C > \kappa$. Proposed to describe gradient-driven coherence disruptions, to be formalized via differential topology.
- NARRATIVE ENTANGLEMENT (NE-014): $D_{\mathrm{KL}}(\,\|\, <)\delta$. Envisioned to model information entanglement in narrative systems, using KL divergence as a coherence metric.
- INTELLECTON LENSING (IL-015): $\theta \propto R_{S,\mathcal{F}}$. Hypothesized to represent angular distortions in intellecton fields, to be explored through geometric optics analogies.

3 Contextual Integration

Future work will include schematics illustrating:

- RESONANCE CHANNELS: RC-003, IN-004, FR-007 [2, 1].
- MODULATION FREQUENCY: PI-008, HD-010 [2, 3].
- BANDWIDTH: CC-005, OF-009 [2, 4].
- SIGNATURE: SP-006, IN-004 [2, 1].

4 Implications

- APPLICATIONS: EEG analysis (OF-009) [4], cosine similarity (HD-010) [3], recurrence metrics (IN-004) [1].
- FALSIFIABILITY: Testable via $D_{\mathrm{KL}}(\,\|\,)$ and $R_{S,T}$ [3].

5 Conclusion

This lexicon unifies coherence, emergence, and dynamics, primed for dissemination on platforms such as arXiv or OSF.

Appendix: Notation Glossary

SYMBOL	DESCRIPTION
$S(t)$	System state at time t
$\Phi_S(t)$	Fieldprint of system S
$M_S(t)$	Self-model of system S
$\mathcal{F}$	Intelligence Field
κ	Coupling strength
σ	Noise amplitude
W_t	Wiener process
$R_{S,T}$	Resonance metric
$D_{\text{KL}}(\,\|\,)$	KL divergence
θ	Angular distortion in intellecton lensing (speculative)
ρ	Recursive echo density (speculative)
γ	Growth exponent in harmonic drift

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