Systemics $\{}Sigma$ — Minimal Specification

Charter

Charter *(normative)*

This document gives a domain-agnostic, minimal formal specification of Systemics *Sigma*. It treats any practice as a kernel-shaped contract that produces decisions from posted evidence under benign variation, with replayable records. No specific domain assumptions (physics, ML, audits, etc.) are required.

Alphabet (Objects & Maps)

Alphabet *(normative)*

- U: Universe of artifacts.
- $\mathbb{V}$: Valuation space (any measurable space; commonly \{}mathbb{R}^k \{}times \{}mathbb{B}^m).
- $\mathbf{2}$: Decision space \{}mathbf{2} = {0,1}.
- Π: Frames (benign contexts).
- P_n: Probes (benign perturbations).
- Θ: Floors/thresholds (partially ordered set).
- β: Invariance budgets (tolerances in a poset/lattice).
- C: Capacity budgets (bits/time/energy constraints).
- Γ: Envelope/meta (versions, seeds, numeric modes, commits).
- $\mathcal{R}$: Records (canonical map \{}to bytes; hash/ledger optional).

Definition: Systemic Kernel

Systemic Kernel *(normative)*

A systemic kernel is the tuple \{}\{}begin{equation} K_\{}\{}mu^\{}\{}Sigma \{}\{};=\{}\{}; \{}\{}big(v,\{}\{} \{}\{}chi,\{}\{} \{}\{}Pi,\{}\{} P_n,\{}\{} \{}\{}Theta,\{}\{} \{}\{}beta,\{}\{} C,\{}\{} \{}\{}Gamma\{}\{}big), \{}\{}end{equation} where $v:U\{}\{}to \{}\{}mathbb{V}$ is a valuation map and $\{}\{}chi:\{}\{}mathbb{V}\{}\{}times\{}\{}Theta\{}\{}times\{}\{}beta\{}\{}to \{}\{}mathbf{2}$ is a decision gate.

Metrics & Order

Wobble and orderings *(normative)*
- A divergence ("wobble") w :
mathbbV
times
mathbbV
to
$mathbbR_{ge0}$ on decision-relevant coordinates. - Orders:
theta
preceq
$theta'$ means tightening floors;
$beta'$
preceq
beta means tightening budgets; C'
preceqC means shrinking capacity.

Axioms (Minimal Core)

-A1 Well-typedness *(normative)*
(Well-typedness). All maps are measurable/continuous as needed;
chi is total.
-A2 Posting / Records-only *(normative)*
(Posting / Records-only). For any run on u
inU, the record
kappa
in
mathcalR contains $(v(u)$,
Theta,
beta, C,
Pi, P_n,
Gamma), and the decision equals \{}\{}begin{equation} \{}\{}chi^\{}\{}ast(u;\{}\{}kappa) \{}\{};=\{}\{}; \{}\{}chi\{}\{}big(v(u),\{}\{}Theta,\{}\{}beta\{}\{}big), \{}\{}end{equation} with no dependence on unposted data.
-A3 Benign invariance *(normative)*
(Benign invariance). Let (
pi, p)
in
Pi
times P_n act on the measurement/evaluation pathway to yield $v_{pi,p}(u)$. Define \{}\{}begin{equation}
W(u)\{}\{};:=\{}\{};\{}\{}sup*{(\{}\{}pi,p)}\{}\{}; w\{}\{}!\{}\{}big(v*{\{}\{}pi,p}(u),\{}\{},v*{\{}\{}pi0*
\{}\{}end{equation} If $W(u)$
preceq
beta then $\{}\{}chi\{}\{}big(v{\{}\{}pi,p}(u),\{}\{}Theta,\{}\{}beta\{}\{}big)=\{}\{}chi\{}\{}big(v*{\{}\{}*
-A4 Minimal sufficiency under capacity *(normative)*
(Minimal sufficiency under capacity). Among valuations preserving decisions under posted
(
Theta,

beta), v is minimal w.r.t.\{}\{} C: \{}\{}begin{equation} \{}\{}forall v'\{}\{}; \{}\{}big(\{}\{}chi\{}\{}!\{}\
v'=\{}\{}chi\{}\{}!\{}\{}circ v\{}\{}big)\{}\{} \{}\{}Rightarrow\{}\{} \{}\{}mathrm{cost}(v')\{}\{}
\{}\{}succeq\{}\{} \{}\{}mathrm{cost}(v)\{}\{}quad\{}\{}text{subject to }C. \{}\{}end{equation}

-A5 Reflexive reproducibility *(normative)*

(Reflexive reproducibility). There exists an admissible, independently realized v' (different numeric/route) such that \{}\{}begin{equation} \{}\{}chi\{}\{}big(v(u),\{}\{}Theta,\{}\{}beta\{}\{}big)\{}
\{}\{}end{equation} with both posted in
kappa (self-warrant).

-A6 Determinism & idempotence *(normative)*

(Determinism & idempotence). For fixed
big($v(u)$,
Theta,
beta
big), the decision
chi is unique and idempotent.

-A7 Monotonicity *(normative)*

(Monotonicity). Tightening floors or budgets cannot rescue a failure by hidden dependence:
\{}\{}begin{equation} \{}\{}theta\{}\{}preceq \{}\{}theta',\{}\{} \{}\{}beta'\{}\{}preceq \{}\{}beta\{}\{
\{}\{}chi(v,\{}\{}theta,\{}\{}beta)=1 \{}\{} \{}\{}Rightarrow\{}\{} \{}\{}chi(v,\{}\{}theta',\{}\{}beta')\
\{}\{}text{with no hidden rescue.} \{}\{}end{equation}

-A8 Isomorphism invariance *(normative)*

(Isomorphism invariance). If a frame
pi induces a structure-preserving isomorphism on representation, decisions are invariant.

Conformance (Lawful Record)

-lawful record checklist *(normative)*

A record
kappa
in
mathcalR is
Sigma-lawful iff it includes: 1. **Contract:**
Theta,
beta, C,
Pi, P_n,
Gamma (with any guards like
epsilon). 2. **Valuation:** $v(u)$ (decision-relevant coordinates posted). 3. **Decision:**
chi
big($v(u)$,
Theta,
beta
big) and a reason enumerating passed/failed predicates. 4. **Invariance evidence:** wobble metrics and the realizing worst-case (
pi, p). 5. **Reflexive warrant:** independent $v'(u)$ and agreement of
chi. 6. **Canonicalization:** canonical bytes, digest d, and optional chain root for append-only books.

Morphisms of Systemics

Morphism F: ’ *(normative)*

A morphism $F:\{}\{}Sigma\{}\{}to\{}\{}Sigma’$ is a pair $(\{}\{}phi_U,\{}\{}phi_V)$ with \{}\{}begin{equation} v’ \{}\{}circ \{}\{}phi_U \{}\{};=\{}\{}; \{}\{}phi_V \{}\{}circ v,\{}\{}qquad \{}\{}chi’ \{}\{}circ (\{}\{},\{}\{}phi_V\{}\{}times\{}\{}mathrm{id}\{}\{},) \{}\{};=\{}\{}; \{}\{}chi, \{}\{}end{equation} that also maps contracts monotonically: $F(\{}\{}Theta,\{}\{
respects the relevant orders and preserves $(\{}\{}Sigma$-A1,...,A7).

Morphism preservation *(normative)*

A morphism preserves valuation and decision structure by satisfying: \{}\{}begin{equation} v’ \{}\{}circ \{}\{}phi*U \{}\{};=\{}\{}; \{}\{}phi*V \{}\{}circ v,\{}\{}qquad \{}\{}chi’ \{}\{}circ (\{}\{},\{}\{}phi_V\{}\{}times\{}\{}mathrm{id}\{}\{},) \{}\{};=\{}\{}; \{}\{}chi. \{}\{}end{equation} It also maps contract parameters monotonically and preserves (-A1,...,A7).

Instantiation Recipe (Domain-Agnostic)

Recipe *(informative)*

To realize
$Sigma$ in any field: 1. Choose U,
$mathbbV$, v,
chi. 2. Post
$Theta$,
$beta, C$,
Pi, P_n,
$Gamma$ and a wobble metric w. 3. Establish (-A1,...,A7) by construction and tests. 4. Emit lawful
$kappa$ and (optionally) hash-chain pages into a book.

Notes

Notes *(informative)*

This specification does not fix what v measures, what
chi decides, or how w is computed. It only requires posting, invariance under benign variation, minimal sufficiency under capacity, and reflexive reproducibility. Evidence Systemics is one instantiation where v encodes evidence gauges; other instances (Control, Protocol, Risk, Learning, etc.) keep the same
$Sigma$-contract while choosing different v,
$Theta$,
$beta$.

References

- GraphFrame K0 (GF0) ()
- SpecFrame K1 ()
- Composition (separate spec) ()