

# Systemics Minimal Specification (K1)

## Charter

### Charter (*normative*)

specifies a contract-shaped kernel that produces decisions from posted evidence under benign variation, with replayable records, without making domain assumptions.

## Alphabet (Objects & Maps)

### Alphabet (*normative*)

- $U$ : universe of artifacts
- $V$ : valuation space (any measurable space; commonly  $\mathbb{R}^k \times \mathbb{B}^m$ )
- $\mathbb{2}$ : decision space  $\mathbb{2} := \{0,1\}$
- $\Pi$ : frames / benign contexts
- $P_n$ : probes / benign perturbations
- $\Theta$ : floors/thresholds (partially ordered set)
- $\beta$ : invariance budgets (tolerances in a poset/lattice)
- $C$ : capacity budgets (bits/time/energy constraints)
- $\Gamma$ : envelope/meta (versions, seeds, numeric modes, commits)
- $R$ : records (canonical map bytes; hash/ledger optional)

## Definition: Systemic Kernel

### Systemic Kernel (*normative*)

A systemic kernel is the tuple:  $K_{mu}^{Sigma} := (v, \chi, P_i, P_n, \Theta, \beta, C, \Gamma)$ , where  $v : U \rightarrow V$  and  $\chi : V \rightarrow \mathbb{2}$  times  $\Theta$  times  $\beta$  to  $\mathbb{2}$ .

## Metrics & Order

### Wobble and orderings (*normative*)

*Sigma* assumes a divergence ("wobble")  $w : V$

$times V$

to

$\mathbb{R}_{ge0}$  on decision-relevant coordinates. Orders:

$\Theta$

$\preceq$

$\Theta'$  means tightening floors;

$\beta'$

$\preceq$

$\beta$  means tightening budgets;  $C'$

$\preceq C$  means shrinking capacity.

### Axioms (Minimal Core)

#### -A1 Well-typedness (*normative*)

All maps are measurable/continuous as needed;  $\gamma$  is total on  $V \in \mathbb{E}$ .

#### -A2 Posting / Records-only (*normative*)

For any run on  $u \in U$ , the record  $R$  contains  $(v(u), \gamma, C, P_n)$ , and the decision equals  $\gamma(u; R) = (v(u), \gamma)$ , with no dependence on unposted data.

#### -A3 Benign invariance (*normative*)

Let  $(\gamma, p) \in P_n$  act on the measurement/evaluation pathway to yield  $v_{\{p\}}(u)$ . Define  $W(u) := \sup \{ \gamma(p) \mid w(v_{\{p\}}(u), v_{\{0,p0\}}(u)) \}$ . If  $W(u) = 1$  then for all benign  $(\gamma, p)$ ,  $(v_{\{p\}}(u), \gamma) = (v_{\{0,p0\}}(u), \gamma)$ .

#### -A4 Minimal sufficiency under capacity (*normative*)

Among valuations preserving decisions under posted  $(\gamma, \beta)$ ,  $v$  is minimal w.r.t. capacity cost subject to  $C$ : for all  $v'$ ,  $(v' = v) \implies \text{cost}(v') \leq \text{cost}(v)$ , subject to  $C$ .

#### -A5 Reflexive reproducibility (*normative*)

There exists an admissible, independently realized  $v'$  (different numeric/route) such that  $(v(u), \gamma) = (v'(u), \gamma)$ , with both posted in  $R$  (self-warrant).

#### -A6 Determinism & idempotence (*normative*)

For fixed  $(v(u), \gamma)$ , the decision  $\gamma$  is unique and idempotent under re-evaluation.

#### -A7 Monotonicity (*normative*)

Tightening floors or budgets cannot rescue a failure by hidden dependence. For  $\gamma'$  and  $\gamma''$ ,  $(v, \gamma) = 1$  implies  $(v, \gamma', \gamma'') \in \{0,1\}$  with no hidden rescue: tightening must not create a pass whose justification depends on data not posted in the record.

#### -A8 Isomorphism invariance (*normative*)

If a frame  $\gamma$  induces a structure-preserving isomorphism on representation, decisions are invariant.

### Conformance (Lawful Record)

#### -lawful record checklist (*normative*)

A record  $R$  is -lawful iff it includes: (1) contract  $(\gamma, \beta, C, P_n)$  and guards, (2) valuation  $v(u)$  (decision-relevant coords), (3) decision  $(v(u), \gamma)$  with reasons, (4) invariance evidence (wobble metrics + worst-case  $(\gamma, p)$ ), (5) reflexive warrant  $(v'(u)$  and agreement), (6) canonicalization: canonical bytes, digest  $d$ , and optional chain root.

## Morphisms of Systemics

### **Morphism F:** $\mathcal{V} \rightarrow \mathcal{V}'$ (*normative*)

A morphism  $F: \mathcal{V} \rightarrow \mathcal{V}'$  is a pair  $(U, V)$  such that the following commutation laws hold:  $v' U = V v$ , and  $v' (\_V \oplus \text{id}) = v$ . A morphism also maps contracts monotonically so that axioms remain satisfied.

### **Morphism preservation** (*normative*)

A morphism preserves valuation and decision structure by satisfying:  $v' U = V v$ ,  $v' (\_V \oplus \text{id}) = v$ . It also maps contract parameters monotonically and preserves -A1..-A7.

## Instantiation Recipe (Domain-Agnostic)

### **Recipe** (*informative*)

Choose  $U, V, v, ;$  post  $_, C, P_n$ , and wobble metric  $w$ ; establish -A1..-A7 by construction/tests; emit lawful  $\mathcal{V}$  and optionally chain pages into books.

## Notes

### **Notes** (*informative*)

This specification does not fix what  $v$  measures, what  $\mathcal{V}$  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  $\mathcal{V}$  contract while choosing different  $v, ;, .$

## References

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