

# 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)

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- $U$ : universe of artifacts
- $V$ : valuation space (any measurable space; commonly  $R^k \times B^m$ )
- $2$ : decision space  $2 := \{0,1\}$
- $\Pi$ : 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*,  
*Pi*, *Pn*,  
*Theta*,  
*beta*, *C*,  
*Gamma*), where  $v : U$   
*toV* and  
*chi* :  $V$   
*times*  
*Theta*  
*times*  
*beta*  
*to2*.

## Metrics & Order

### Wobble and orderings (*normative*)

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

*timesV*

*to*

$\mathbb{R}_{\geq 0}$  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*)

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

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

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

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

Let  $(, p) \in P_n$  act on the measurement/evaluation pathway to yield  $v\{, p\}(u)$ . Define  $W(u) := \sup\{(, p)\} w(v\{, p\}(u), v\{0, p_0\}(u))$ . If  $W(u) = 0$  then for all benign  $(, p)$ ,  $(v\{, p\}(u), \dots) = (v\{0, p_0\}(u), \dots)$ .

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

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

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

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

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

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

### -A7 Monotonicity (*normative*)

Tightening floors or budgets cannot rescue a failure by hidden dependence. For  $v' \geq v$  and  $v' \neq v$ ,  $(v', \dots) = 1$  implies  $(v, \dots, v') \in \{0, 1\}$  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 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  $(, , C, , P_n, \dots)$  and guards, (2) valuation  $v(u)$  (decision-relevant coords), (3) decision  $(v(u), \dots)$  with reasons, (4) invariance evidence (wobble metrics + worst-case  $(, p)$ ), (5) reflexive warrant  $(v'(u) \text{ and } \text{agreement})$ , (6) canonicalization: canonical bytes, digest  $d$ , and optional chain root.

## Morphisms of Systemics

### **Morphism F:** $\cdot$ (*normative*)

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

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

A morphism preserves valuation and decision structure by satisfying:  $v' \circ U = V \circ v$ ,  $\cdot \circ (\_V \otimes id) = \cdot$ . 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 and optionally chain pages into books.

## Notes

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

This specification does not fix what  $v$  measures, what 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 contract while choosing different  $v, ,$ .

## References

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