

## **GhostLink — Proof of Record (PoR)**

GhostLink – Proof of Record (PoR) Mechanical tests with thresholds: 1) Reproducibility  $\leq 10\%$  stdev/mean. 2) Robustness:  $\geq 80\%$  continuity-positive across  $\pm 20\%$  sweeps. 3) Predictive lift  $\geq 5\%$  vs baseline. 4) Cost advantage:  $(|\Delta|/|V|) \leq 0.20$  and  $\leq 0.30 \times$  step-cost. 5) SOC: tail exponent  $1 < \tau < 3$ , KS  $p \geq 0.05$ , branching  $\approx 1$ . 6) Legacy gain:  $\Delta MI \geq 0.01$  bits/cell or  $\geq 2\%$  lift. 7) Compression: MDL slope negative on  $\geq 75\%$  epochs. 8) Topology invariance:  $\leq 10\%$  diff planar vs spherical. 9) Ablation:  $\geq 15\%$  degradation without scars/order. Run tests via: `python tests/run_proof.py` Outputs: `proof_report.json`, `proof_plots/`