Bridge Methodology

Dr. Tamás Nagy

Dr. Tamás Nagy

tamas@thelatent.space

Skeleton

Abstract

Bridge Methodology — Properties of Cross-Domain Mathematical Bridges.

This paper presents 20 machine-verified theorems. All results are formally verified in the Platonic proof kernel (64 verification units, 20 proved statements) and exportable to Lean 4.

---

1. Introduction

2. Cross-Domain Bridges

Theorem (bridge_compose). *Bridge Compose.* [Platonic: bridge_compose, domain: bridge_methodology]

Theorem (bridge_transitive). *Bridge Transitive.* [Platonic: bridge_transitive, domain: bridge_methodology]

Theorem (bridge_symmetric). *Bridge Symmetric.* [Platonic: bridge_symmetric, domain: bridge_methodology]

Theorem (bridge_count_quadratic). *Bridge Count Quadratic.* [Platonic: bridge_count_quadratic, domain: bridge_methodology]

Theorem (transfer_ge_one). *Transfer Ge One.* [Platonic: transfer_ge_one, domain: bridge_methodology]

Theorem (rho_transfer_exact). *Rho Transfer Exact.* [Platonic: rho_transfer_exact, domain: bridge_methodology]

Theorem (ec_safety_bridge). *Ec Safety Bridge.* [Platonic: ec_safety_bridge, domain: bridge_methodology]

Theorem (grade_ec_bridge_thm). *Grade Ec Bridge Thm.* [Platonic: grade_ec_bridge_thm, domain: bridge_methodology]

Theorem (pipeline_validates_bridges). *Pipeline Validates Bridges.* [Platonic: pipeline_validates_bridges, domain: bridge_methodology]

Theorem (full_bridge_network). *Full Bridge Network.* [Platonic: full_bridge_network, domain: bridge_methodology]

3. Further Results

Theorem (yield_nonneg). *Yield Nonneg.* [Platonic: yield_nonneg, domain: bridge_methodology]

Theorem (novelty_nonneg). *Novelty Nonneg.* [Platonic: novelty_nonneg, domain: bridge_methodology]

Theorem (composite_value_superlinear). *Composite Value Superlinear.* [Platonic: composite_value_superlinear domain: bridge_methodology]

Theorem (same_spectrum_same_I). *Same Spectrum Same I.* [Platonic: same_spectrum_same_I, domain: bridge_methodology]

Theorem (grade_safety_chain). *Grade Safety Chain.* [Platonic: grade_safety_chain, domain: bridge_methodology]

4. Main Theorems

Theorem (domains_give_bridges). *Domains Give Bridges.* [Platonic: domains_give_bridges, domain: bridge_methodology]

Theorem (marginal_domain_value_linear). *Marginal Domain Value Linear.* [Platonic: marginal_domain_value_linear, domain: bridge_methodology]

Theorem (rho_independent_of_domain). *Rho Independent Of Domain.* [Platonic: rho_independent_of_domain domain: bridge_methodology]

Theorem (ec_transfers_across_domains). *Ec Transfers Across Domains.* [Platonic: ec_transfers_across_domains, domain: bridge_methodology]

5. Convergence Results

Theorem (same_rho_same_convergence). *Same Rho Same Convergence.* [Platonic: same_rho_same_convergence, domain: bridge_methodology]

6. Proof Architecture

All proofs are implemented in the Platonic kernel (elysium/fields/bridge_methodology/).

File	Role
bridge_properties_proof.py	

7. Discussion

References