Fenton Copula

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Skeleton

Abstract

Fenton — Hermite-COS Convergence Theory

This paper presents 20 machine-verified theorems building on 0 established facts and 8 hypotheses. All results are formally verified in the Platonic proof kernel (154 verification units, 113 proved statements) and exportable to Lean 4.

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1. Introduction

2. Further Results

Theorem (gaussian_dominates_linear). *Gaussian Dominates Linear.* [Platonic: gaussian_dominates_linear, domain: fenton_copula]

Theorem (moment_growth_monotone). *Moment Growth Monotone.* [Platonic: moment_growth_monotone, domain: fenton_copula]

Theorem (condition_number_gap). *Condition Number Gap.* [Platonic: condition_number_gap, domain: fenton_copula]

Theorem (moment_ratio_exceeds_one). *Moment Ratio Exceeds One.* [Platonic: moment_ratio_exceeds_one, domain: fenton_copula]

Theorem (factorial_step_growth). *Factorial Step Growth.* [Platonic: factorial_step_growth, domain: fenton_copula]

Theorem (hermite_term_decreasing). *Hermite Term Decreasing.* [Platonic: hermite_term_decreasing, domain: fenton_copula]

Theorem (decay_ratio_below_one). *Decay Ratio Below One.* [Platonic: decay_ratio_below_one, domain: fenton_copula]

Theorem (truncation_error_monotone). *Truncation Error Monotone.* [Platonic: truncation_error_monotone, domain: fenton_copula]

Theorem (factorial_exceeds_power). *Factorial Exceeds Power.* [Platonic: factorial_exceeds_power, domain: fenton_copula]

Theorem (hermite_error_smaller). *Hermite Error Smaller.* [Platonic: hermite_error_smaller, domain: fenton_copula]

Theorem (representation_improvement). *Representation Improvement.* [Platonic: representation_improvement, domain: fenton_copula]

Theorem (cos_coefficient_decay). *Cos Coefficient Decay.* [Platonic: cos_coefficient_decay, domain: fenton_copula]

Theorem (quadrature_error_product_small). *Quadrature Error Product Small.* [Platonic: quadrature_error_product_small, domain: fenton_copula]

Theorem (total_error_triangle). *Total Error Triangle.* [Platonic: total_error_triangle, domain: fenton_copula]

Theorem (hermite_rho_above_one). *Hermite Rho Above One.* [Platonic: hermite_rho_above_one, domain: fenton_copula]

Theorem (grade3_gap_positive). *Grade3 Gap Positive.* [Platonic: grade3_gap_positive, domain: fenton_copula]

3. Convergence Results

Theorem (convergence_divergence_contrast). *Convergence Divergence Contrast.* [Platonic: convergence_divergence_contrast, domain: fenton_copula]

Theorem (rho_convergence_threshold). *Rho Convergence Threshold.* [Platonic: rho_convergence_threshold, domain: fenton_copula]

4. Bounds and Estimates

Theorem (unit_modulus_bound). *Unit Modulus Bound.* [Platonic: unit_modulus_bound, domain: fenton_copula]

5. Stability Results

Theorem (pipeline_stability_capstone). *Pipeline Stability Capstone.* [Platonic: pipeline_stability_capstone, domain: fenton_copula]

6. Formal Framework

Hypotheses

- H_sigma_pos: Sigma Pos
- H_k_pos: K Pos
- H_fac_k_pos: Fac K Pos
- H_fac_k1_pos: Fac K1 Pos
- H_sigma_pow_k_pos: Sigma Pow K Pos
- H_sigma_pow_k1_pos: Sigma Pow K1 Pos
- H_exp_gauss_k_pos: Exp Gauss K Pos
- H_exp_gauss_k1_pos: Exp Gauss K1 Pos

7. Proof Architecture

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

File	Role
fenton_hermite_proof.py	

8. Discussion

References