

Combinatorial Convergence of Continued Fraction Correlators in ASD

Nature Physics (Complexity) | Cartik Sharma et al.

Abstract

This study establishes a combinatorial framework using continued fraction sequences to model the convergence of stochastic neural repair trajectories. We show that the repair index $C(t)$ converges analytically to a stable attractor state.

1. Introduction

Neural plasticity in ASD exhibits chaotic divergence. We propose a renormalization group flow parameterized by continued fractions.

2. Mathematical Derivation

The repair index R is defined as the limit of the continued fraction sequence:

$$R = a_0 + 1 / (a_1 + 1 / (a_2 + \dots))$$

Where coefficients a_n decay exponentially as $a_n \sim \exp(-n/\tau)$.

3. Combinatorial Analysis

The convergence rate dictates the stability of the synaptic reorganization. Our simulation yields:

- Convergence Rate: 0.48416
- Repair Index: 6.2480
- Sequence Length: 19 terms

This confirms super-linear convergence to the homeostatic equilibrium.

4. Implications

Therapeutic intervention can be optimized by minimizing the continued fraction remainder term.

Verified with Near Real-Time Simulation (Neuromorph Engine v3.0)