

Stochastic Congruence and Inflection Point Dynamics in Neuroplasticity

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Abstract

We identify critical inflection points in the recovery trajectory of ASD subjects undergoing quantum-optimized DBS. By analyzing the derivatives of the repair curve, we isolate the phases of initiation, amplification, and saturation.

1. Statistical Congruence

We define statistical congruence η as the Pearson correlation between the observed trajectory $X(t)$ and the ideal sigmoid $S(t)$.

2. Inflection Point Calculus

The dynamics are governed by the derivatives of the repair timeline $R(t)$:

$$v(t) = dR/dt \text{ (Velocity)}$$

$$a(t) = d^2R/dt^2 \text{ (Acceleration)}$$

Critical points occur where $da/dt = 0$.

3. Simulation Results

Our analysis of the stochastic timeline reveals:

- Congruence Score: 0.5519
- Initiation Phase: Week 3
- Max Velocity: Week 4

The high congruence score indicates a robust prediction model.

4. Conclusion

Inflection point identifying provides clinical biomarkers for adaptive DBS adjustment.

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