Nonlinear plasticity models increase noise robustness and pattern retrieval capacity

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Neural fields provide a framework to model and analyze the collective behavior of neurons in the brain. Due to the large number of neurons involved, direct simulation of individual neurons is computationally expensive. Instead, neural fields offer an averaged description of neural activities, capturing essential dynamics such as firing rates, connectivity patterns, and potential changes over time.

These models are instrumental in understanding both the theoretical and practical aspects of brain activity. For example, they are used to study synchronization phenomena, wave propagation, and the emergence of stable activity patterns. The continuous nature of neural field equations enables their application to spatially extended networks, while discrete models are particularly suitable for graph-based neural structures.

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