

Dynamical effects of dendritic structure on neural systems

- - The Dynamic Brain: From Spiking Neurons to Neural Masses and Cortical Fields



Description: -
-dynamical effects of dendritic structure on neural systems
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Notes: Thesis (Ph.D.) - Loughborough University, 2000.
This edition was published in 2000



Filesize: 40.76 MB

Tags: #Extracting #single

Dynamical analysis of dendritic mixed bursting within the pre

Neurons were grouped into four categories depending on the relative centrality of the soma, and the number of dendritic branches connected to the soma. Dynamics of benchmark neurites To better understand the relationship between neuronal morphology and dynamics, we constructed and simulated a set of artificial neurites, which consist only of two branches.

Effect of dendritic backpropagating action potential on neural interaction

Cross-correlation coefficients To compare DONA with a typical measure of neural interaction, we calculated the cross-correlation coefficients of neuron pairs in the given time bin. Understanding the fundamental principles underlying higher brain functions requires the integration of different levels of experimental investigation in cognitive neuroscience from single neurons, neuroanatomy, neurophysiology, and neuroimaging, to neuropsychology and behavior via a unifying theoretical framework that captures the neural dynamics inherent in the elaboration of cognitive processes.

Single

In each case, the point at which the number of somatic stems reduces to 1 red arrow closely corresponds to the most inefficient state Fig.

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We compare this with an explicit model of neural mass dynamics at the mesoscopic scale in the subsequent section. To investigate these correlates, neural interactions are typically abstracted from spike trains of pairs of neurons accumulated over the course of many trials. This approximation is valid when the axonal delays contribute mostly to the dynamics, for instance in large-scale networks, when the local dynamics are much faster than the network dynamics.

Dendritic Cells

The key thing about this parameterisation is that most modes will decay or dissipate very quickly. In that case, the average firing rate of the compartments is identical and does not depend on topology. Certain signalers, such as CaMKII, are upregulated in response to activity.

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