

**Loxley, P. N.; Robinson, P. A.**

**Spike-rate adaptation and neuronal bursting in a mean-field model of brain activity.** (English)

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Summary: Spike-rate adaptation is investigated within a mean-field model of brain activity. Two different mechanisms of negative feedback are considered; one involving modulation of the mean firing threshold, and the other modulation of the mean synaptic strength. Adaptation to a constant stimulus is shown to take place for both mechanisms, and limit-cycle oscillations in the firing rate corresponding to bursts of neuronal activity are investigated. These oscillations are found to result from a Hopf bifurcation when the equilibrium lies between the local maximum and local minimum of a given nullcline. Oscillations with amplitudes significantly below the maximum firing rate are found over a narrow range of possible equilibriums.

**MSC:**

92C20 Neural biology

45K05 Integro-partial differential equations

82D99 Applications of statistical mechanics to specific types of physical systems

Cited in 1 Document

**Full Text:** [DOI](#)

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