Abstract

This article presents the reduction of neuronal models from the classic four-dimensional differential model of Hodgkin and Huxley [7] to discrete binary automata which keep the main properties of more complex models. A reduction of Fitzhugh and Nagumo (FHN) model is performed using a numerical strategy introduced in [3] completed by a linearization in the spirit of McKean model [14]. The resultant discrete binary model keeps the properties of the complete FHN model. The numerical simulations of networks composed by these discrete binary automata demonstrate changes in the system dynamics dependent on the coupling strength. Moreover, for large coupling strength, phase-locking is observed.
References


Index Terms

Computer Science
Applied Sciences
Keywords
neuronal models  Hodgkin and Huxley model  FitzHugh Nagumo model  binary model
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