Submitted: 12 February 2016
Accepted: 29 March 2016
Published Online: 19 April 2016

Suppression of phase synchronisation in network based on cat's brain

Chaos **26**, 043107 (2016); https://doi.org/10.1063/1.4945796

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ABSTRACT

We have studied the effects of perturbations on the cat's cerebral cortex. According to the literature, this cortex structure can be described by a clustered network. This way, we construct a clustered network with the same number of areas as in the cat matrix, where each area is described as a sub-network with a small-world property. We focus on the suppression of neuronal phase synchronisation considering different kinds of perturbations. Among the various controlling interventions, we choose three methods: delayed feedback control, external time-periodic driving, and activation of selected neurons. We simulate these interventions to provide a procedure to suppress undesired and pathological abnormal rhythms that can be associated with many forms of synchronisation. In our simulations, we have verified that the efficiency of synchronisation suppression by delayed feedback control is higher than external time-periodic driving and activation of selected neurons of the cat's cerebral cortex with the same coupling strengths.

ACKNOWLEDGMENTS

We wish to acknowledge the support from CNPq, CAPES (5527/13-9 and 10583/13-0), FAPESP (2015/07311-7 and 2011/19296-1), and IRTG 1740/TRP 2011/50151-0 funded by the DFG/FAPESP.

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