

Abstract Submitted
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A low dimensional description of globally coupled heterogeneous neural networks of excitatory and inhibitory neurons ROXANA A. STEFANESCU, Florida Atlantic University, VIKTOR K. JIRSA, CNRS and Florida Atlantic University — Neural networks consisting of globally coupled excitatory and inhibitory non-identical neurons may exhibit a complex dynamic behavior including synchronization, multi-clustered solutions in phase space and oscillator death. We investigate the conditions under which these behaviors occur in a multidimensional parametric space defined by the connectivity strengths and dispersion of the neuronal membrane excitability. Using mode decomposition techniques, we further derive analytically a low dimensional description of the neural population dynamics and show that the dynamics of the entire network can be very well reproduced by this reduced system. Examples of networks of FitzHugh-Nagumo and Hindmarsh-Rose neurons are discussed in detail.

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