



ΣΕΜΙΝΑΡΙΟ ΚΕΝΤΡΟΥ ΚΒΑΝΤΙΚΗΣ ΠΟΛΥΠΛΟΚΟΤΗΤΑΣ & ΝΑΝΟΤΕΧΝΟΛΟΓΙΑΣ/
CCQCN SEMINAR

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11:00-12:00

3rd Floor Seminar Room

Chimera states in networks of nonlocally coupled neural oscillators

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Abstract

Chimera states is a peculiar phenomenon of coexisting coherent and incoherent behaviour discovered in networks of nonlocally coupled identical phase oscillators over ten years ago. Since then, chimeras were found to occur in a variety of theoretical and experimental studies. In this work, we are interested in the existence of chimera states in systems modelling neuron excitability and dynamical behaviour. First, we consider a generic model for a saddle-node bifurcation on a limit cycle representative for neuron excitability type I. We obtain multichimera states depending on the distance from the excitability threshold and the range of nonlocal coupling. A detailed study of the effect of all dynamical parameters on the stability of the chimera states is presented. Next, we consider a system of nonlocally coupled Hindmarsh-Rose oscillators which is a prototype system for type-I and type-II neuron excitability that can reproduce many dynamical features of real neurons. We find various interesting synchronization patterns including chimera states in both spiking and bursting regimes.

