Universality and Synchronization in Complex Quadratic Networks

Authors : Anca Radulescu, Danae Evans

Abstract : The relationship between a network's hardwiring and its emergent dynamics are central to neuroscience. We study the principles of this correspondence in a canonical setup (in which network nodes exhibit well-studied complex quadratic dynamics), then test their universality in biological networks. By extending methods from discrete dynamics, we study the effects of network connectivity on temporal patterns, encapsulating long-term behavior into the rich topology of network Mandelbrot sets. Then elements of fractal geometry can be used to predict and classify network behavior.

Keywords : canonical model, complex dynamics, dynamic networks, fractals, Mandelbrot set, network connectivity
Conference Title : ICCMN 2022 : International Conference on Computational and Mathematical Neuroscience
Conference Location : Paris, France
Conference Dates : March 28-29, 2022