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Effects of Different Connectivity Topologies in Small World Networks on EEG-Like Activities

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Abstract: Based on our previously pulse-coupled integrate-and-fire neuron model in small world networks, we investigate the effects of different connectivity topologies on complex behavior of electroencephalographic-like signals produced by this model. We show that several times series analysis methods that are often used for analyzing complex behavior of electroencephalographic-like signals, such as reconstruction of the phase space, correlation dimension, fractal dimension, and the Hurst exponent within the rescaled range analysis (R/S). We find that the different connectivity topologies lead to different dynamical behaviors in models of integrate-and-fire neurons.

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Key words: correlation dimension, Hurst exponent, small world networks