On stable formation of cortical cognitive maps via M-matrices

Vladimir Kostić, and Ljiljana Cvetković
Department of Mathematics and Informatics, Faculty of Science,
University of Novi Sad, Novi Sad, Serbia
vkostic@dmi.uns.ac.rs, lila@dmi.uns.ac.rs

Key words: Dynamical Systems, Neural Networks, Stability, M-matrices

Biological neural networks represent large and multi-time-scale nonlinear dynamical systems that model both the activity and synaptic changes. Such complex systems are in the foundation of every cognitive task memorized in the form of cortical cognitive map, and, therefore, should be thoroughly mathematically analyzed. Especially, it is important to understand their dynamical behavior which, due to activation functions and synaptic weights, has instabilities. In this talk we will address conditions for stable formation of cortical cognitive maps in long term memory that emerge from theory of M-matrices, and are applicable to such large scale problems.