

Seminar/Talk

Convergence of asymptotic systems with unbounded delays to Cohen-Grossberg neural networks with applications and Lotka-Volterra systems

Abstract: We study the dynamics of two prominent classes of models: Cohen-Grossberg neural network (CGNN) and Lotka-Volterra ecological systems. Firstly, we investigate the global exponential stability and the existence of a periodic solution of a general differential equation with unbounded distributed delays. The main stability criterion depends on the dominance of the non-delay terms over the delay terms. We use the main results to obtain criteria for the existence and global exponential stability of periodic solutions of a generalized higher-order periodic CGNN model with discrete-time varying delays and infinite distributed delays. Moreover, we study the convergence of asymptotic systems in nonautonomous CGNN models. We derive stability results under conditions where the non-delay terms asymptotically dominate the delay terms. In the second part, we explore Lotka-Volterra-type ecological models with delays. We investigate the concept of permanence of a general delay differential system and apply it to a general Lotka-Volterra type model. Moreover, we study the convergence criteria to its asymptotic systems. Additionally, we provide a comparison with results in the literature and numerical examples to illustrate the effectiveness of some of our results.

- **Data:** 14 Novembro 2025, 16h00min;
- **Local:** Sala 6.17.