# Global Stability of a Generalized Cohen-Grossberg Model with Unbounded Time-Varying Delays

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## Abstract

In this talk, we establish sufficient conditions for the existence and global stability of an equilibrium point of the following generalized Cohen-Grossberg neural network model with unbounded discrete time-varying delays:

$$\dot{x}_i(t) = -k_i(x_i(t)) \left( b_i(x_i(t)) + \sum_{j=1}^{n} \sum_{p=1}^{P} h_{ij}^{(p)}(x_j(t - \tau_{ij}^{(p)}(t)) \right), t \geq 0, \qquad (1)$$

where $k_i, h_{ij}^{(p)}, \tau_{ij}^{(p)} : \mathbb{R} \to \mathbb{R}$ are continuous with $k_i(t), \tau_{ij}^{(p)}(t)$ positive.

We apply the results to the particular model

$$\dot{x}_i(t) = -k_i(x_i(t)) \left[ b_i(x_i(t)) - \sum_{j=1}^{n} c_{ij} g_j(x_j(t)) - \sum_{j=1}^{n} d_{ij} f_j(x_j(t - \tau_{ij}(t))) \right], \qquad (2)$$

improving recent results in the literature.

We emphasize that, contrary to the usual, we do not use Lyapunov functionals to obtain our results.