

# Nonuniform contractions and stability of Hopfield neural networks with delay

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We obtain a result on the behavior of the solutions of a general class of nonautonomous Hopfield neural network model with delay, assuming some general bound for the product of consecutive terms in the sequence of neuron charging times and some conditions to control the nonlinear part of the equations. Our results are based on a new abstract result on the behavior of nonautonomous delayed equations.

When we restrict to the particular case of a periodic Hopfield model, our conditions for existence of a globally stable periodic solution generalize the results in [1]. We are also able to obtain global exponential stability for the models in [2] under distinct hypothesis from the ones assumed in that paper.

This talk is based on joint work with António G. Bento and José J. Oliveira [3].

[1] Xu, H., Wu R., Periodicity and exponential stability of discrete-time neural networks with variable coefficients and delays, *Adv. Difference Equ.* (2013) 2013:226, 19.

[2] Wei, X., Zhou, D., Zhang, Q., On asymptotic stability of discrete-time nonautonomous delayed Hopfield neural networks, *Comput. Math. Appl.* 57 (11-12) (2009), 1938–1942.

[3] António J. G. Bento, José J. Oliveira, César M. Silva, *Nonuniform behavior and stability of Hopfield neural networks with delay*, arXiv:1504.04318 [math.DS].