Exponential stability of general neural network models with infinity distributed delays

Teresa Faria[a] and <u>José J. Oliveira</u>[b]

[a]Departamento de Matemática and CMAF, Faculdade de Ciências,
Universidade de Lisboa, Campo Grande, 1749-016 Lisboa, Portugal
e-mail: tfaria@ptmat.fc.ul.pt

[b]Departamento de Matemática e Aplicações and CMAT, Escola de Ciências,
Universidade do Minho, Campus de Gualtar, 4710-057 Braga, Portugal
e-mail: jjoliveira@math.uminho.pt

Abstract

In this talk, we establish sufficient conditions for the existence and global exponential stability of an equilibrium point x^* of the following general neural network model with infinity distributed delays

$$\dot{x}_i(t) = -\rho_i(t, x_i(t))[b_i(x_i(t)) + f_i(t, x_t)], \quad t \geq 0, \ i = 1, \ldots, n. \tag{1}$$

We apply the general result to several delayed neural networks models, such as Cohen-Grossberg neural networks, bidirectional associative memory neural networks, and cellular neural networks with S-type distributed delays, generalizing known results in the literature.

We emphasize that, contrary to the usual, we do not use Lyapunov functionals to obtain our results, which can therefore be applied to a very general setting.