



Mês de: Julho 2007

SEMINÁRIOS DE ANÁLISE

Dia 19 de Julho (quinta-feira), às 14h15, na Sala B3-01

Stability for n-species Lotka-Volterra Models with Distributed Delays

Teresa Faria

(IDepartment of Mathematics and CMAF, Faculdade de Ciências,
University of Lisbon, 1749-016 Lisboa, Portugal)

tfaria@ptmat.fc.ul.pt)

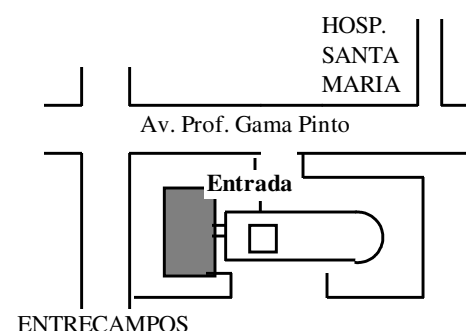
Abstract:

We consider multiple species Lotka-Volterra type models of the form

$$x'_i(t) = r_i(t) x_i(t) \left[1 - b_i x_i(t) - \sum_{j=1}^n l_{ij} \int_{-r}^0 x_j(t+\theta) d\mathcal{N}_{ij}(\theta) \right], \quad i = 1, \dots, n, \quad (1)$$

where $b_i, l_{ij} \in \mathbb{R}$, $r > 0$, $r_i(t)$ are positive continuous functions and $\mathcal{N}_{ij}: [-r, 0] \rightarrow \mathbb{R}$ are normalized bounded variation functions. We assume the existence of a positive equilibrium x^* of (1), and study its local and global asymptotic stability. For $r_i(t) \equiv r_i > 0$, necessary and sufficient conditions for local stability independent of the choice of the delay functions \mathcal{N}_{ij} are given, by imposing a weak nondelayed diagonal dominance which cancels the delayed competition effect. The global asymptotic stability of x^* is established under conditions slightly stronger than the ones required for the linear stability. For the case of monotone interactions,

Local:
COMPLEXO INTERDISCIPLINAR
Av. Prof. Gama Pinto, 2
1649-003 Lisboa





UNIVERSIDADE DE LISBOA
CENTRO DE MATEMÁTICA E APLICAÇÕES FUNDAMENTAIS
Av. Prof. Gama Pinto 2, 1649-003 LISBOA, PORTUGAL Tel. (351) 217 904 700 FAX (351) 217 954 288

however, sharper conditions are presented. This work generalizes known results for discrete delays to systems with distributed delays.

Parcialmente suportado pela FCT ao abrigo do Programa POCTI

Local:
COMPLEXO INTERDISCIPLINAR
Av. Prof. Gama Pinto, 2
1649-003 Lisboa

