



Mês de: **Setembro 2007**

SEMINÁRIOS DE ANÁLISE

Dia 20 de Setembro (quinta-feira), às 14h15, na Sala B3-01

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

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Abstract:

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

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

where $b_i, l_{ij} \in \mathbb{R}$, $r > 0$, $r_i(t)$ are positive continuous functions and $\eta_{ij} : [-r, 0] \rightarrow \mathbb{R}$ 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 η_{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, however, sharper conditions are presented. This work generalizes known results for discrete delays to systems with distributed delays.

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