ALPEN-ADRIA UNIVERSITÄT KLAGENFURT

Invitation to a Guest Lecture

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"Sensitivity Analysis for Time-Varying Ecological Networks"

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Abstract

We generalize the sensitivity analysis to press perturbations for ecological networks described by time-varying ODE systems. Despite that, in a time-invariant framework, the sensitivity analysis has been successfully employed to assess the overall effects stemming from sustained changes in species growth rates on the equilibrium values of other indirectly related species, its generalization to the time varying case has remained elusive. Our accomplishments were based in two classical topics of ordinary differential equations: i) the smoothness of solutions with respect to parameters and ii) the properties of exponential dichotomy and admissibility, which were combined with recent advances in the theory of non autonomous dynamical systems inspired on the new concept of "bounded entire solutions" and its local properties. Specifically, we derive the sensitivity matrix as the solution of a non homogeneous linear matrix differential equation, which can be explicitly computed by using results from exponential dichotomy and admissibility. In addition, time averaging provides alternative ergodic characterizations for the sensitivity matrix in terms of the community one.

Christian Pötzsche and the Department of Mathematics look forward to seeing you at the talk!