ALPEN-ADRIA UNIVERSITÄT KLAGENFURT

Invitation to the Doctoral Seminar

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"Aspects of Nonautonomous Bifurcations"

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Abstract

Discrete time dynamical systems appear in many applications throughout science, engineering and economics; either as models for inherently discrete time processes like population growth or quarterly sales, or as discretizations of continuous time processes such as chemical reactions or mechanical motions. For explicitly time dependent models the corresponding system is nonautonomous, otherwise it is autonomous. Autonomous systems describe models in static environments, such as industrial or laboratory environments, whereas nonautonomous systems describe models in settings where the environment changes naturally over time, for example in biology and other life sciences. The underlying models often depend on additional parameters, such as physical, chemical or biological properties, or other environmental factors. In this setting, it is crucial to understand how the parameters alter the behavior of the system and to classify this behavior for different parameter choices. Moreover, it is important to identify the critical parameter values in which the system's behavior undergoes a qualitative change. Such qualitative changes in the behavior of a system are called bifurcations and are studied in the field of bifurcation theory.
This talk introduces the concept of a nonautonomous bifurcation via a

generalization of the autonomous Neimark-Sacker bifurcation in a model system. Moreover, we discuss some of the tools used in autonomous and nonautonomous bifurcation theory and highlight their differences. Finally, we explore some possible applications of nonautonomous discrete time dynamical systems.

Elena Resmerita and the Department of Mathematics look forward to seeing you at the talk!