ALPEN-ADRIA UNIVERSITÄT KLAGENFURT

INVITATION TO THE DOCTORAL SEMINAR

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"Uncertainty Quantification for Tipping Points in Random Ordinary Differential Equations"

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Abstract

Subsystems of the earth might undergo critical transitions under sustained global warming, i.e. pass a tipping point. This poses severe threats on ecosystems and human habitat. The tipping phenomenon is not restricted to climate science but also appears in ecology and epidemiology [1]. Here, we approach these critical transitions mathematically in terms of bifurcation theory for nonlinear ordinary differential equations. It is well-known in the theory of dynamical systems that parameter variation can induce bifurcations. Our main question of interest is how uncertainties in system parameters propagate through the possibly highly nonlinear dynamical system and affect the occurrence of different bifurcation types [2]. While some types cause rather smooth qualitative changes, others correspond to a tipping point. In this talk, I will combine known statistical and probabilistic concepts with bifurcation theory to contribute to a risk assessment of the exposure to tipping points.

Michaela Szölgyenyi and the Department of Statistics look forward to seeing you at the talk!