ALPEN-ADRIA UNIVERSITÄT KLAGENFURT

INVITATION TO THE DOCTORAL SEMINAR

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"Global stability for price models with delay"

classroom.aau.at/math-stat

Wednesday, 5 May 2021

11:00 a.m.

Abstract

After a short introduction to the field of delay and neutral differential equations, we consider the delay equation $\dot{x}(t) = a\int_0^r x(t-s)\,d\eta(s) - g(x(t))$ and the neutral type equation $\dot{y}(t) = a\int_0^r \dot{y}(t-s)\,d\mu(s) - g(y(t))$ where $a > 0$, $g : \mathbb{R} \to \mathbb{R}$ is smooth, $ug(u) > 0$ for $u \neq 0$, $\int_0^s g(u)\,du \to \infty$ as $|s| \to \infty$, $r > 0$, η and μ are nonnegative functions of bounded variation on $[0, r]$, $\eta(0) = \eta(r) = 0$, $\int_0^r \eta(s)\,ds = 1$, μ is nondecreasing, μ does not have a singular part, $\int_0^r d\mu = 1$. Both equations can be interpreted as price models. Global asymptotic stability of $y = 0$ is obtained, in case $a \in (0, 1)$, for the neutral equation by using a Lyapunov functional. Then this result is applied to get global asymptotic stability of $x = 0$ for the (non-neutral) delay differential equation provided $a \in (0, 1)$. As particular cases, two related global stability conjectures are solved, with an affirmative answer.

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