ALPEN-ADRIA UNIVERSITÄT KLAGENFURT

INVITATION TO THE DOCTORAL SEMINAR

Global stability for price models with delay

Istvan Balazs | Universität Klagenfurt

Chaired by Christian Pötzsche | Department of Mathematics

Wednesday, 5 May 2021 | 11:00–11:45

classroom.aau.at/math-stat

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.

We hope to see you there!