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Global stability for price models with delay

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This is a joint work with Tibor Krisztin. We consider the delay differential equation

$$\dot{x}(t) = a \int_0^r x(t-s)\, d\eta(s) - g(x(t)) \tag{1}$$

and the neutral differential equation

$$\dot{y}(t) = a \int_0^r \dot{y}(t-s)\, d\mu(s) - g(y(t)), \tag{2}$$

where $a > 0$, $ug(u) > 0$ for all $u \in \mathbb{R} \setminus \{0\}$, and some further conditions hold. Both equations can be interpreted as price models. Global asymptotic stability of $y = 0$ is obtained, in case $a \in (0, 1)$, for (2) by using a Lyapunov functional. Then this result is applied to get global asymptotic stability of $x = 0$ for (1) provided $a \in (0, 1)$. As particular cases, two related global stability conjectures are solved, with an affirmative answer.