Practical Stability for Measure FDEs via Generalized ODEs

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In this talk we present the concept of practical stability in the realm of generalized ODEs and using the correspondence between a generalized ODE and a measure FDE, we prove that the measure FDEs whom satisfy some suitable hypothesis, are uniformly practically stable and practically asymptotically stable. Our goal was to investigate the direct method of Lyapunov and its converse.

Existence of at least two positive and periodic solutions for nonlinear delay differential equations

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We study a nonlinear delay differential equation of the form

$$u''(t) + cu'(t) + \lambda a(t)g(u(t), u(t-\gamma)) = 0,$$

where $\gamma > 0$ is given, $a : \mathbb{R} \to \mathbb{R}$ is an L^1 map, T-periodic for a given $T > 0$ and g is a continuous function, sublinear at infinity and superlinear at zero. We prove the existence of at least two positive and T-periodic solutions when $\int_0^T a(t)dt < 0$ e $\lambda > 0$ is sufficiently large. We extend this result to the equation

$$u''(t) + cu'(t) + \varepsilon u(t) + \lambda a(t)g(u(t), u(t-\gamma)) = 0$$

with $\varepsilon > 0$ sufficiently small. The approach is topological using the coincidence degree theory by J. Mawhin.

Stability of scalar delay equations: stories from the non-autonomous world

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In this talk, we shall introduce some simple criteria that guarantee the absolute and conditional stability of the trivial solution for a scalar equation with a variable nonnegative delay. Applications to well-known population dynamics models are presented to illustrate the results.

Continuation theorems for periodic systems with nonlinear time-dependent differential operators

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The lecture propose some continuation theorems for the periodic problem

$$\begin{cases} x_i' = g_i(t, x_{i+1}), & i = 1, \dots, n-1, \\ x_n' = h(t, x_1, \dots, x_n), & \\ x_i(0) = x_i(T), & i = 1, \dots, n, \end{cases}$$