

TIME DELAY SYSTEMS

Webinar

TDS

2022

## Back and forth between the infinite and the finite: a numerical view of time delay systems



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**Dec. 2, 2022, Friday @ 4:00 pm (CET)**

7:00 am (PDT), 10:00 am (EDT), 11:00 pm (CST)

**Event will take place via Zoom**

9 AM, hora de México.

**ABSTRACT:** The view of delay differential equations as generators of dynamical systems evolving on function spaces has fostered substantial and essential progress in the study and understanding of these equations since the inspiring works of Krasovskii in the fifties. Of course the price to pay to exploit this enlarged perspective is that of dealing with infinite dimension. On the one hand, the functional analysis of Banach spaces has helped to extend to delay systems well known results holding for ODEs - often with (un)expected difficulties. On the other hand, discretization tools of numerical analysis have entered the scene as a natural way to bring infinite-dimensional objects back to finite ones in view of attaining - hopefully trustworthy approximate - solutions to the considered problems. The talk is about some of the aspects concerned with the interplay between these finite- and infinite-dimensional contexts, mainly in view of numerically addressing questions of stability and bifurcation.

**BIO:** Dimitri Breda (1974) received the Laurea degree in mechanical engineering from the University of Udine, Italy, in 1998 and the Ph.D. in computational mathematics from the University of Padua, Italy, in 2004. He is now associate professor of numerical analysis at the Department of Mathematics, Computer Science and Physics of the University of Udine, where he established and currently leads the Computational Dynamics Laboratory (CDLab <http://cdlab.uniud.it/>). His research interests are in the broad field of numerical and applied mathematical analysis, with particular reference to numerical methods for the stability and bifurcation analysis of infinite-dimensional dynamical systems generated by delay and other classes of functional equations, with main applications in control engineering and population dynamics. He is a member of the IFAC working group "Time Delay Systems" (TC 2.2) and serves regularly the IPC of the related IFAC-TDS workshop series.



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