

Brief CV



Blas Vinagre (bvinagre@unex.es) obtained his M.S. degree in Telecommunications Engineering from the Technical University of Madrid, Spain, in 1985 and his Ph.D. degree in Industrial Engineering from the National University of Distant Learning, Madrid, Spain, in 2001. He worked in industry from 1985 to 1994, mainly in communications, automation, and electronic warfare. In 1994, he joined the University of Extremadura, Spain, as an assistant professor. From 2001 to 2016, he was an associate professor in the Department of Electric, Electronic, and Automation Engineering, where he is now a full professor of

Automatic Control. His research interests focus on the application of fractional calculus in automatic control and robotics, including microrobotics for medical applications. He is a Senior Member of the IEEE.

Talk

SAMPLING FOR CONTROL AND INTEGRAL SUMS. THE ROLE OF FRACTIONAL CALCULUS

Digital control is based on sampling and, in many cases, the obtention of discrete equivalents of plants and controllers. On the one hand, the mathematical foundations of both operations are the quadrature formulas and methods for numerical integration; and on the other hand, each method of quadrature leads to different types of dynamical systems and the use of the proper tools for analysis and design. The normal approach is the periodic sampling, that can be call Riemann sampling by its analogy with integration theory, and leads to time driven control and, for linear time-invariant plants, closed loop systems linear and periodic. The alternative is the use of event-triggered sampling, a nonperiodic sampling rule in which the output signal is sampled only when a specified event occurs. Depending on the definition of the event, the analog integral sum could be Lebesgue, Stieltjes, or any other, and leads to nonlinear and/or time-variant systems. This talk is a review of some of these approaches, and an inquiry on the role that can be played by the fractional integral in this game.

Sampling for control and integral sums. The role of fractional calculus