

Raymond de Callafon



Raymond de Callafon works on control systems from both a theoretical and experimental point of view. He uses experiments and data-based models as a tool to improve product designs and create feedback control systems for electromechanical systems

Once a prototype product or systems is built, de Callafon gives it a test-run and observes the dynamic behavior by collecting time domain data. The measurements form the basis of the dynamic experimental modeling and the development of the control system. This approach gives a realistic and robust control system because it is closely linked to reality due to the direct link to experimental data. This process could be applied to just about any dynamic system that allows experiment design.

Raymond de Callafon is a full professor at the Department of Mechanical and Aerospace Engineering (MAE) at the University of California, San Diego (UCSD). He received his M.Sc. (1992) and his Ph.D. (1998) degrees in Mechanical Engineering from the Delft University of Technology in the Netherlands and moved to San Diego for a postdoctoral position in 1997 at the Dept. of MAE at UCSD. During 1998 he started as an Assistant Professor with the Dept. of MAE and he is currently directing the System Identification and Control Laboratory (SICL) and is an affiliated faculty of the Center for Magnetic Recording Research (CMRR) and the Cymer Center for Control Systems and Dynamics (CCSD) at UCSD. He has also created a new Undergraduate Control Laboratory (UGCL) at UCSD.

To that end, de Callafon did much of his Ph.D. research at the Delft University of Technology with the Philips Research Laboratories in the Netherlands. He worked on a motion controller for a wafer stepper used to fabricate integrated circuits. He also developed models and controllers for a pick-up mechanism in a compact disc player. In both cases, the goal was to reduce and control the mechanical flexibilities and vibrations through feedback control.

The current research interests of Prof. de Callafon include topics in the field of experiment-based approximation modeling, control relevant system identification and recursive/adaptive control. In particular, he is interested in designing and analyzing experiment-based modeling techniques for control relevant identification of linear systems and extending these techniques to specific classes of (block) non-linear and linear parameter varying (LPV) systems. The newly developed model estimation techniques of Prof. de Callafon have been applied to structural damage detection problems, model or controller complexity reduction and (adaptive) feedback tuning in active noise and vibration control for mechatronic motion control systems as found in high precision data storage devices and aero(servo)elastic systems for flutter prediction and control. Most of this work is done with the affiliation to the Center for Magnetic Recording Research (CMRR) and the Cymer Center for Control Systems and Dynamics (CCSD) at the University of California San Diego (UCSD)

The expertise in experimentation, system identification, adaptive filtering and real-time (embedded) control implementation of Prof. de Callafon complements the existing strength of the faculty in the Dynamic Systems and Control group at the Department of Mechanical and Aerospace Engineering at UCSD. He also enjoys teaching students, especially in laboratory and design courses. Prof de Callafon believes it is important to get students excited about what control systems can do. They need to design and implement control systems, conduct experiments and see what results can be obtained. That way, they will understand the importance and hands-on applications of the often hidden aspects of feedback control.