Matthew James

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Title: Quantum Feedback Control

Biography

Matthew R. James' research interests include quantum feedback control, nonlinear robust control, and stochastic control. He received the B.Sc. degree in mathematics and the B.E. (Hon. I) in electrical engineering from the University of New South Wales, Sydney, Australia, in 1981 and 1983, respectively. He received the Ph.D. degree in applied mathematics from the University of Maryland, College Park, USA, in 1988. In 1988/1989 he was Visiting Assistant Professor with the Division of Applied Mathematics, Brown University, Providence, USA, and from 1989 to 1991 he was Assistant Professor with the Department of Mathematics, University of Kentucky, Lexington, USA. In 1991 he joined the Australian National University, Australia, where he served as Head of the Department of Engineering during 2001 and 2002. He has held visiting positions with the University of California, San Diego, Imperial College, London, and University of Cambridge. James is a co-recipient (with L. Bouten and R. Van Handel) of the SIAM Journal on Control and Optimization Best Paper Prize for 2007. He is currently serving as Associate Editor for IEEE Transactions on Automatic Control, and has previously served SIAM Journal on Control and Optimization, Automatica, and Mathematics of Control, Signals, and Systems. He is a Fellow of the IEEE, and he held an Australian Research Council Professorial Fellowship during 2004-2008.

Abstract

Recent theoretical and experimental advances mean that it is now possible to control physical systems at the quantum level. Indeed, developments in quantum technology provide strong motivation for the feedback control of quantum systems. This talk will discuss both measurement feedback and coherent feedback control for quantum systems. Measurement feedback involves conditioning on the measurement information, and so we describe the Belavkin quantum filter and it's use in quantum control. In contrast, coherent feedback does not involve any measurements, and we discuss some recent results on coherent feedback control.