



TUG

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Graz, 18.9.2017

Invitation for a Guest Lecture

Dear colleagues,

I would like to invite you for the following guest lecture given by

Professor Colin Fox

Department of Physics, University of Otago, Dunedin/New Zealand

"Optimal filtering for nonlinear dynamical systems using the finite volume method"

Tuesday, October 3, 2017 at 15:00 hrs
Seminar Room EMT, Inffeldgasse 23/II, second floor

Please forward this invitation to colleagues and friends.

Hope to see you all there!

Georg Brasseur

Abstract:

Optimal Bayesian sequential inference, or filtering, for the state of a deterministic dynamical system requires simulation of the Frobenius-Perron operator, that can be formulated as the solution of a continuity equation. For low-dimensional, smooth systems the finite-volume method is an effective solver that conserves probability and gives estimates that converge to the optimal

continuous-time values. A CFL-type condition assures that intermediate discretized solutions remain positive density functions. We demonstrate this finite-volume filter (FVF) in a simulated example of filtering for the state and length of a pendulum, including a case where rank-deficient observations lead to multi-modal probability distributions.

Colin Fox:

I completed my BSc in Physics and Pure Mathematics, then MSc in Physics (on building acoustics) at The University of Auckland, while running an electronics design company. I completed my PhD in the Cavendish Laboratory of Cambridge University, in the group lead by Steve Gull, John Skilling, and Ed Jaynes. After 18 months implementing my PhD findings for Schlumberger Cambridge Research, I took a post-doctoral position with Vernon Squire in Applied Mathematics at Otago University. From 1990 to 2007 I grew the Applied Mathematics programme at Auckland University, was concurrently Head of the Acoustics Research Centre for 12 years, undertook field work on the sea-ice in Antarctica for a dozen seasons, held visiting positions at Le Mans France (Acoustics), CIMAT Mexico (Probability and Statistics), Clarkson USA (Engineering), Cambridge (Engineering), and Kuopio Finland (Physics), and was seconded on two occasions to Agilent Technology (Palo Alto and Colorado) to undertake research for product development. In 2007 I moved to Otago University to the Electronics research group within the Physics department.