Second Decade

Delays in control systems are bad enough, but what do you do when the delay can change and, even worse, you don't know it? Delays are one of the scourges of feedback control systems, which rarely allow the luxury of leisurely analysis and processing of data. There are no "do-overs" when something must operate in real time and when a one-time failure can cause a one-time disaster.

A complicating factor in dealing with delays within the context of continuous-time systems is that the resulting dynamics are infinite dimensional. The feature article by Miroslav Krstic uses this challenging issue as a springboard for investigating systems with more general infinite-dimensional actuator and sensor dynamics. For systems with pure delay, the article considers cases in which the delay may be either known or unknown, constant or time varying. The article begins with a discussion of the classical Smith predictor, developed by Otto Smith 50 years ago. We sadly report that Prof. Smith

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Mohinder Grewal at Lake Louise in Calgary, Canada.

Kamal Premaratne with his wife Deepthi and their daughter Dhilani in Lagos, Portugal.

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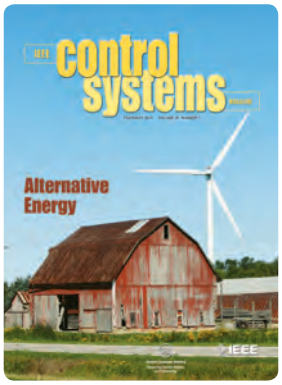
recently passed away. For a biography on Prof. Smith, see http://en.wikipedia.org/wiki/Otto_J._M._Smith.



The second feature article of this issue is in the spirit of 2010 as the 50th anniversary of the Kalman filter. In their article on thermal estimation for motors, Ruchir Saheba, Mario Rotea, Oleg Wasynczuk, Steven Pekarek, and Brett Jordan develop and demonstrate techniques for realizing "virtual" thermal sensors, where model-based estimation is used to provide temperature estimates at points where it is impossible to install "real" thermal sensors. The article is a clear demonstration of the ability of system-theoretic tools to add value to hardware.

For "Ask the Experts," Mohinder Grewal and Angus Andrews respond to an inquiry about specifications for rate gyros, a basic component of most motion control systems. For "People in Control" we speak to Donald Pierre, emeritus professor at Montana State University, and Mireille Broucke, a faculty member at the University of Toronto.

In continuation of our series on reminiscences, Kamal Premaratne provides an essay on behalf of Eliahu Jury, a major contributor to discrete-time systems theory. We also present the first article in a department named, simply, "Perspectives." This department is devoted to singular essays with minimal editorial involvement. For this first installment, Peter Wellstead discusses the contributions of Arnold Tustin in relation to the field of systems biology.

This issue also brings you a book review, numerous new book announcements, and conference reports (one of which is linked to the timely cover image). We sadly publish an obituary of Mike Sain, who contributed to diverse aspects of our field through service and research.

It's hard to believe that we're a decade beyond the new millennium. Fortunately, our field of endeavor continues to become more and more exciting. Can't wait until April.

Dennis S. Bernstein

Miroslav Krstic with his wife Angela and their daughters Alexandra (left) and Victoria.

The Rotea family in Santorini—Mario and Andrea with their daughter Martina (far left) and sons Diego (center) and Alvaro.

Oleg Wasynczuk with his daughters Kristina (left) and Jacqueline at Celery Bog near Purdue University.

Ruchir Saheba (far left) with friends (from left) Gunjan Gandhi and Janak Pandya at Urquhart Castle beside Loch Ness, Scotland.

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