

About This Issue

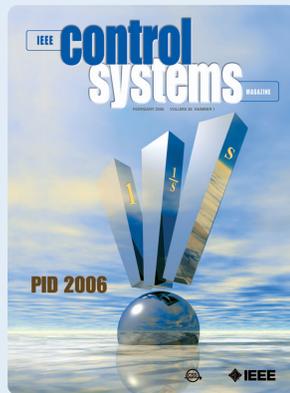
There's an apocryphal story you might have heard. A brilliant graduate student was working at a prestigious institution under a famous professor of control theory. This ingenious student managed to solve several of the deepest longstanding problems of control theory, developing a nonlinear, adaptive control algorithm that was guaranteed to converge globally, under extremely general conditions of noise and modeling uncertainty, to a controller that represented the best possible trade-offs among stability, robustness, and performance, both transient and steady state. All that remained to be done was the computer implementation. Unfortunately, the computational burden was immense, and years passed before a sufficiently powerful computer could be harnessed to perform the massive computations. Finally, the algorithm was implemented, and a group of distinguished researchers, all experts in the most advanced methods and theories of control, waited expectantly for the ultimate controller. When the computations were finished, the answer appeared: PID.

While the IEEE Control Systems Society celebrated its 50th anniversary in 2004, an event celebrated by the December 2004 issue, *IEEE Control Systems Magazine (CSM)* began publication of volume 25 in 2005. However, the true 25th anniversary of this magazine begins with volume 26 for the simple reason that when *CSM* was "born" it was age 1, rather than age 0, the birth age of humans. Consequently, this February 2006 issue begins the second quarter century of this publication.

In preparation for this anniversary issue, I proposed to past IEEE Control Systems Society (CSS) President Mark Spong that the Society support a redesign. The last redesign, initiated by former *CSM* Editor-in-Chief Tariq Samad provided a significant upgrade to the magazine. Why not attempt another makeover on this occasion? Mark agreed without hesitation, and a key component of this anniversary issue was begun. More details on the redesign appear in the interview with the editor-in-chief in the "People in Control" department.

The redesign was the easy part. More challenging was deciding what topic would be appropriate for a 25th anniversary celebration. There were several issues in the works in 2005 that looked like good candidates. The "History of Analog Computing" and "Low-Tech Motion Control" issues were promising, but the timing wasn't right. In the meantime, among the usual flow of contributed papers was a paper on tuning rules for PIDF controllers and another on extremum seeking tuning. I wondered whether PID, an old and weathered topic, still had life in it.

I posed this question to Associate Editor Carl Knospe, who had presented tutorials on PID control at short courses he and I have



given at past ACCs. I asked Carl whether he knew of any other ongoing work on PID control. Carl immediately recalled a talk he attended at the 2005 ACC by Shinji Hara, and Carl agreed to inquire as to whether Shinji and his coworkers had anything suitable to contribute. Soon after that I noticed a PID paper in *IEEE Transactions on Control System Technology* by Li and coworkers. With Editor-in-Chief Frank Doyle's blessing, I contacted Li and asked him whether he was interested in extending his paper to fit our special issue. By that time all of the pieces had come together, and Carl agreed to serve as guest editor. We now had a complete collection of features that focus on one of the most central and powerful methods in all of control technology. What better way could one imagine to celebrate a 25th control anniversary?

In addition to the features, I decided to see whether the other components of the issue could reflect the PID theme. For the "Applications of Control" column I was lucky to solicit and receive two special contributions. First, during a visit to Leuven, Belgium, in February 2005, my host Bart De Moor arranged for me to visit IPCOS, one of the many Universiteit Leuven spinoffs. There I received a personalized lecture on the regulation of pressure in ammonia plants. Just when this aerospace engineer could barely digest another Pascal of process control, my personal briefer transitioned to RaPID, an industrial tool for tuning PID controllers from all vendors. Have I got a project for you!

Next, I contacted David Ames at SRS, Inc., the manufacturer of the SIM960 analog PID controller. *CSM* spoke with SIM960 developer Matt Kowitt in the February 2005 issue about the motivation for and innovations behind this device. My question for Dave was "Which users of the SIM960 would be willing to describe their successes with this new product?" While many were willing, the challenge was to find a user with a nonproprietary application. Indeed, one was found, namely, optical phasing control for the Altacama Large Millimeter Array, to be built in Chile by a consortium of countries. It's interesting to see that, in addition to engineering applications, control technology can be enabling for advanced scientific applications.

All that remained now was to focus the book reviews on the PID literature. A quick check with Associate Editor for Book Reviews Kirsten Morris revealed that a book on PID control of delay systems was in the pipeline. Meanwhile, we discovered an encyclopedic work on PID tuning rules as well as a collection of papers on PID control. And at the last minute, we learned about the third edition of the classic work by Åström and Hagglund.

In the current issue, we introduce Scott Ploen as the new associate editor for book reviews. Many thanks to Kirsten, who, in her year of service, greatly raised the level of the quality and depth of book reviews.

With the redesign as the setting for a new look at a timeless topic, we recall that control system technology begins with the basics and tackles the complex. Happy anniversary!

—DSB