

Travel Report from ACC'04

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1. Introduction

The 2004 American Control Conference (ACC04) took place June 30 to July 2 in Boston. ACC is one of the two largest annual conferences within the control community. The original purpose of the trip was to organize a workshop "Tools and Techniques for Control Loop Timing Analysis" demonstrating our work within the area of integrated control and real-time systems design. Unfortunately, however, it turned out that this was not the right community to present this kind of interdisciplinary research. The workshop was canceled in the last minute due to lack of registered participants.

The interest for control within the real-time community is large and growing. Sadly, the reverse situation is not that common. However, I also had a paper in an invited session treating performance control of computing systems (mainly web servers), which was the reason I still went to the conference.

2. The Boston Area

This was my first visit in Boston, and I really liked the city. Many parts of the city had an European flavor and the conference venue was conveniently located in the heart of the city.

On the days before the conference started we had time to pay visits to Harvard and MIT and to taste the Maine lobster in the harbor. We also were able to locate a sports bar that was going to show the upcoming semi-finals of the Euro 2004 soccer championship!

3. The Conference

The conference featured 1031 papers (corresponding to a 57 percent acceptance ratio) presented in 19 parallel sessions over the course of three days. This to compare with real-time conferences that usually run in one single session with an acceptance ratio around 30 percent. The large number of papers made it virtually impossible to cover all interesting presentations.

However, as mentioned in the introduction, only a very small fraction of the papers were related to real-time aspects of control systems, which is my area of

research. The sessions most closely related to my own area of research mainly treated various aspects of networked control and control of computing systems. No session treated real-time implementation aspects of control loops.

4. Interesting Presentations

Below I will briefly present some of the presentations that I found most interesting.

"Packet-Based Control", D. Georgiev, and D. Tilbury

This paper presented an efficient use of the packet structure for networked control systems. By storing output and control signal samples and submitting sequences of these in single packets the network traffic and computation time in the controller node can be reduced. The resulting multirate system was analyzed and an H_2 -optimal controller was derived.

"Inverted Pendulum Stabilization through the Ethernet Network, Performance Analysis", O.R. Natale, O. Sename, and C. Canudas-de-Wit

This paper treated control over the standard Ethernet MAC layer protocol, and evaluated the effects of the MAC policy and network load on control performance for three different control strategies. The compared controllers were; a pole placement controller, an LQ-controller and a H_∞ -controller. For the performance simulations the authors had used the TrueTime toolbox developed by our group in Lund.

"Challenges in Control Engineering of Computing Systems", Tutorial session organized by Joe Hellerstein, IBM

This was the tutorial session in which I had my own contribution, work performed in collaboration with Tarek Abdelzaher at University of Virginia on web server delay control. The session featured a one-hour introduction by Joe Hellerstein followed by four 15-minute presentations. The session gave a good overview of current research (both industrial and academic) on the use of control-theoretical methods for performance control of complex and stochastic systems such as web servers.