Clemson University who represented ASME Automotive and Transportation Systems Committee (he is also a member of the TCAC). These sessions aimed to present a coherent and focused picture of recent advances in vehicle dynamics, sensor and diagnostics, advanced propulsion systems (fuel cells and HCCI), powertrain control, and automotive modeling.

4) A successful lunch meeting of the Technical Committee was held on Wednesday, June 8, 2005 at the American Control Conference in Portland, OR. The meeting minutes are available from the TCAC website.

On-going and Future Activities

1) In progress are the organization of the invited sessions for 2006 IEEE Conference on Control Applications in Munich (Kevin Fishbach, Lino Guzzella of ETH, Bob Koch of University of Alberta, Ibrahim Haskara, and Akira Ohata of Toyota are the organizers)

2) In progress is the organization of as a Special Issue on Automotive Control for IEEE Transactions on Control System Technology (Julie Buckland, Kevin Fischbach, Ibrahim Haskara and Ilya Kolmanovsky are the organizers).

3) Planning is underway for 2007 Multi-Conference on Systems and Control in Singapore (Sharon Liu, Thielong Shen of Sophia University and Ilya Kolmanovsky are the organizers).

4) In-progress is the organization of a one day workshop on "Open Problems and Challenges in Automotive Powertrain Control," which will take place immediately after the 2006 SAE World Congress.

Technical Committee on Computer Aided Control System Design

From: Didier Henrion, Chair
Date: October 31, 2005

Software:

The main objective of the TC on CACSD is to promote the production of high-quality software for system analysis and controller design. During the second semester of 2005, the following CACSD software was developed/updated/distributed:

-Software for approximate linear system identification
ftp://ftp.esat.kuleuven.ac.be/pub/SISTA/markovsky/abstracts/04-221a.html

-Software for deterministic linear system identification
ftp://ftp.esat.kuleuven.ac.be/pub/SISTA/markovsky/abstracts/05-122.html

-A Matlab toolbox for weighted total least squares approximation
ftp://ftp.esat.kuleuven.ac.be/pub/SISTA/markovsky/abstracts/04-220.html

-The new, Release 5.0 of the SLICOT Library for control theory computations was posted on a new Web site, www.slicot.org
It includes improvements of many routines, bug fixes, more detailed installation and usage information, SLICOT Toolboxes for MATLAB, and additional demonstration files. SLICOT incorporates functionality that is not available in MATLAB, such as computations for block Toeplitz matrices, periodic Hessenberg and Schur decomposition, and eigenvalues of Hamiltonian matrices. For some calculations, including model reduction and system identification, SLICOT performance can be significantly better than MATLAB performance, with possible speed-up factors of 10 or more. MATLAB Release 7(+) includes SLICOT solvers for Sylvester and Lyapunov equations and block diagonalization.

Conference activities:

- Invited session on LMI in control organized by Yoshio Ebihara and Dimitri Peaucelle at CDC/ECC 2005

- At least one mini-symposium proposal regarding behavioral system and control theory and its applications will be submitted to MTNS 2006 by Paolo Rapisarda

- One minicourse on behavioural system theory will be held by Jan C. Willems and P. Rapisarda at MTNS 2006, see http://www-ics.acs.i.kyoto-u.ac.jp/mtns2006/abstracts/pr-jcw.pdf

- The 4th International Workshop on Total Least Squares and Errors-in-Variables Modeling is organized by Sabine Van Huffel and Ivan Markovsky, see
http://homes.esat.kuleuven.be/~imarkovs/workshop.html

- A meeting of the IEEE TC on CACSD is planned during the joint IEEE CDC and ECC in Sevilla in December 2005. The opportunity of organizing a CACSD symposium jointly with the CCA and ISIC conferences in Singapore in 2007 is a point needing further discussion.

- An OpCom meeting of the IEEE CCA/CACSD/ISIC 2006 is planned during the joint IEEE CDC/ECC in Sevilla in December 2005, involving several TC members. For the CACSD related activities, the General Chair Andras Varga proposes the following actions: 1. Sponsored CACSD Keynote Speaker: Cleve Moler or Pascal Gahinet from The MathWorks; 2. The MathWorks have been contacted to sponsor the CACSD Best Student Paper Award; 3. Jan Maciejowski will be the CACSD Plenary Speaker.

- Vasile Sima organizes an invited session at the IFAC Symposium on Robust Control Design (ROCOND), which will take place in Toulouse on July 2006. Yoshio Ebihara and Dimitri Peaucelle also organize an invited session for this conference, with many TC members involved in the IPC.

Journals, books:

- collaboration with SIAM concerning a forthcoming book Exact and Approximate Modeling of Linear Systems: A Behavioral Approach
ftp://ftp.esat.kuleuven.ac.be/pub/SISTA/markovsky/abstracts/05-128.html

- Randomized Algorithms for Analysis and Control of Uncertain Systems Series: Communications and Control Engineering Tempo, Roberto; Calafiore, Giuseppe; Dabbene, Fabrizio 2005, XVII, 344 p. 54 illus., Hardcover ISBN: 1-85233-524-6, Springer Verlag

Focus:

Action Group on Numerical Methods in the Behavorial Setting chaired by Ivan Markovsky and Paolo Rapisarda
http://homes.esat.kuleuven.be/~imarkovs/aghomepage.html

The action group on numerical methods in the behavioral setting studied exact and approximate deterministic modeling problems. We depart from the classical equation error paradigm and define the problems without a reference to a particular representation of the model. The deterministic formulation of the problems is emphasized for its conceptual clarity.

The simplest and most natural modeling problem is to find a model in a model class that first the given data and as little else as possible (a notion called the most powerful unfalsified model). Solving the exact modeling problem helps to attack more complicated approximate, stochastic, and approximate--stochastic problems. The exact modeling problem for the linear time-invariant (LTI) model class includes as a special case the much studied (partial) realization problem. We found verifiable from the data conditions for existence of solution. This identifiability result leads to new algorithms for system identification as well as new understanding of existing algorithms.

The following approximate identification problem was considered: minimize the l2 norm of the difference between a given time series and an approximating one under the constraint that the approximating time series is a trajectory of a LTI system of a fixed complexity. The complexity is measured by the input dimension and the maximum lag. Special cases of the problem are autonomous system identification, approximate realization, and finite time optimal l2 model reduction. We developed efficient software package that implements the theory.