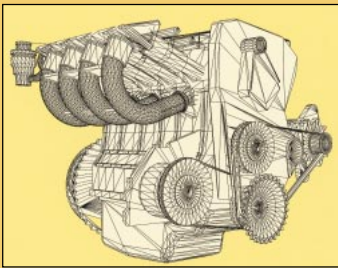


Workshop on the Integration of Modeling and Control for Automotive Systems

June 5–6, 1999

University of California, Santa Barbara

Center for Control Engineering and Computation
Mechanical and Environmental Engineering Department



Organizers

ANNA STEFANOPOULOU
University of California, Santa Barbara

ANDREW ALLEYNE
University of Illinois, Urbana-Champaign

ROY SMITH
University of California, Santa Barbara

KARL HEDRICK
University of California, Berkeley

GIORGIO RIZZONI
Ohio State University

International Advising Committee

J. ACKERMANN
DLR, Germany

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Swiss Federal Institute of Technology, Switzerland

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University of Tokyo, Japan

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University of Southern California, US

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R. MIDDLETON
University of Newcastle, Australia

Conference Information ►

Workshop on the Integration of Modeling and Control for Automotive Systems

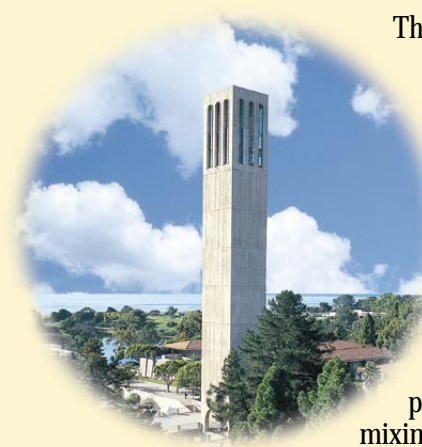
(Sponsored by NSF, ASME DSCD, and IEEE CSS)

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IN THE LAST TWO DECADES control has had an undeniable impact on the improvement of automotive systems. Control algorithms have aided the automation of the manufacturing processes thereby reducing cost and increasing cycle time. They have been the enabling technology in reducing emissions, thus, having a tremendous environmental impact on society. Controls have enabled automotive manufacturers to provide customers with significant performance and safety improvements at reasonable costs. As automotive systems become increasingly complicated the model development, analysis, controller design, optimization and verification becomes a challenging task. The lack of data, the interdisciplinary nature, and the existence of multiple layers of modeling and controller details (all the way from distributed to discrete event systems) make the integration of modeling and control a critical step towards system development.

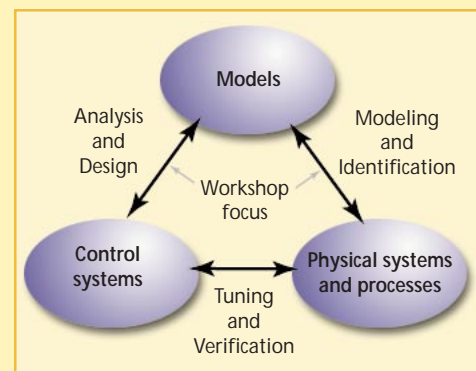
The current control analysis and synthesis approach can be made to perform in a satisfactory manner on a case-by-case basis. The success of these approaches is usually directly linked to the resident engineering expertise and experience available. However, good engineering judgment should be aided by system-theoretic concepts and, thus we focus on the need for a seamless integration between modeling and control design.



This workshop will consider specific examples of control problems, spanning several areas of automotive systems, which require different levels of modeling accuracy and abstraction:

- **ENGINE AND POWERTRAIN CONTROL:** Featuring problems in flow, combustion, and emission control for novel engine processes. It addresses control critical powertrains that require detailed physical models of spatial flow patterns, mixing, chemical reactions.
- **VEHICLE DYNAMICS AND CONTROL:** Featuring problems related to sensor and actuator limitations, human factors, and safety. It also addresses issues related to intelligent vehicle highway systems.
- **FAULT DETECTION, DIAGNOSTICS AND MONITORING:** Featuring problems in modeling processes for fault detection, on-board diagnosis and monitoring. The models here have to capture actuator and sensor redundancies and interactions.
- **LARGE SCALE SYSTEMS:** Featuring problems software implementation of control algorithms and the need for verification tools, and fault tolerant mechanisms. Here the required representations are databases of component characteristics, finite state machines, real time simulations and hybrid systems.

The examples will serve as paradigms where the gaps between modeling and control design were bridged or could not be bridged. Discussion of these examples will lead to formulation of benchmark problems, suggest research directions, and accelerate the development towards solutions.



Hotel Reservations and Transportation



The meeting will be held at
ENG II PAVILLION

Contact person for more information:

CHRISTI LUNG
Engineering II, Room 2355,
Mechanical and Environmental Engr
University of California,
Santa Barbara, CA 93106

christi@engineering.ucsb.edu

(805) 893-2430 (Phone)
(805) 893-8651 (Fax)

or

ANNA STEFANOPOULOU
anna@engineering.ucsb.edu

(805) 893-8501

Hotel Reservations:

Best Western South Coast Inn
5620 Calle Real, Goleta, (805) 967-3200

Best Western South Coast Inn has blocked 25 rooms for the event. The rate is \$85.00/night with UCSB/NSF Workshop discount. The deadline for guaranteed reservation is **MAY 5**.

Other beach front hotels/resorts:

1. Four Seasons Biltmore Hotel, 969-2261
2. El Encanto Hotel, 687-5000
3. Fess Parker's Doubletree Hotel, 564-4333
4. Villa Rosa Hotel, 966-0851
5. Santa Barbara Inn, 966-2285
6. Radisson Hotel, 963-0744

Transportation

Comprehensive visitor information can be found at the Santa Barbara Travel Web Page created as a class project by Engineering students in the UCSB Writing Program: (<http://www.engineering.ucsb.edu/community/>)

BY AUTOMOBILE

Santa Barbara is about 100 miles from Los Angeles and about 350 miles from San Francisco on Highway 101. Real-time information on Southern California Road Conditions is available from Caltrans (<http://www.dot.ca.gov/hq/roadinfo/do5map.htm>)

BY AIR

Flights arrive at the Santa Barbara Airport from Los Angeles, San Francisco and Denver. Airbus service from Los Angeles is also available: call (805) 964-7759. (<http://eci2.ucsb.edu/~guentert/>)

BY RAIL

A variety of Amtrak options to and from Santa Barbara are available (<http://www.amtrakwest.com/amwschidx.html>)

BY SEA

Information on Santa Barbara Harbor (<http://www.sailorschoice.com/SBHarbor.htm>)