



**The Center for Control, Dynamical Systems, and Computation  
University of California at Santa Barbara  
Fall 2006 Seminars  
Presents**

## **Constant-Factor Approximation Algorithms for Stochastic Control**

**by Sanjay Lall**

**Stanford University**

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### **Abstract:**

For many control problems, computation of the optimal controller is intractable. Our objective in this research is to develop simple algorithms for computing approximately optimal policies, and show that the resulting cost achieved is close to the optimal achievable cost.

We present a simple way to compute upper and lower bounds on the performance of stochastic control systems. We consider Markov decision processes over general state spaces, and our approach allows any function to be used as an approximate Hamilton-Jacobi solution.

We give a number of examples including event-based sampling, dynamic planning for multiple vehicles, decentralized decision problems and queuing. For each of these we construct a decentralized policy and give a bound on the ratio of the cost achieved to the optimal achievable cost.

### **About the Speaker:**

Sanjay Lall is Assistant Professor of Aeronautics and Astronautics at Stanford University. Until 2000 he was a Research Fellow at the California Institute of Technology in the Department of Control and Dynamical Systems, and prior to that he was NATO Research Fellow at Massachusetts Institute of Technology, in the Laboratory for Information and Decision Systems. He received the Ph.D. in Engineering from the University of Cambridge, England. His research interests include optimization-based approaches for distributed control.

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