

SEMINAR

Co-Sponsored by the University of California Transportation Center (UCTC)

**Tuesday, October 9, 2012
4:00 – 5:00 pm**

Seminar Room 4080 AIR Building

EXACT AND FAST TRAFFIC FLOW ESTIMATION USING MIXED INTEGER LINEAR PROGRAMMING

Dr. Christian G. Claudel

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Electrical Engineering and Mechanical Engineering
King Abdullah University of Science and Technology (KAUST)**

This talk describes a new framework for solving control and estimation problems in systems modeled by scalar conservation laws with convex flux, with applications to highway traffic flow estimation and control. Using an equivalent Hamilton-Jacobi formulation, we show that the solution to the original PDE can be written semi-analytically. Using the properties of the solutions to HJ PDEs, we prove that when the data of the problem is prescribed in piecewise affine form, the constraints of the model are mixed integer linear. This property enables us to identify a class of transportation engineering problems (control, estimation, fault detection, user privacy analysis) that can be solved exactly using MILPs.

Christian Claudel is an assistant professor of Electrical Engineering and Mechanical engineering at KAUST. He received the PhD degree in EECS from UC Berkeley in 2010, and the Ms degree in Plasma Physics from Ecole Normale Supérieure de Lyon in 2004. He received the Leon Chua Award from UC Berkeley in 2010 for his work on Mobile Millennium. His research interests include control and estimation of distributed parameter systems, wireless sensor networks and environmental sensing systems.