Seminar Series

Event-Based Feedforward Control for A Drug Delivery System for Diabetes Care

Prof. Tzyh Jong TARN
Washington University, St. Louis, Missouri, USA
and
Tsinghua University, Beijing, China

Date: 22 February, 2013 (Friday)
Time: 5:00pm – 6:00pm (Tea reception at 4:45pm)
Venue: Room 3601 (AC2)

Abstract
Automation plays an increasingly important role in life sciences. The wide-range applications of life science automation include genomics and proteomics automation, drug delivery system automation, cell and tissue manipulation automation, and medical automation. A key component for the above automation system development is the control mechanism design. For example, controlled drug delivery systems pursue precisely drug targeting and releasing. This obviously requires advanced control instead of conventional open-loop control schemes. Cell and tissue manipulation systems demand control mechanisms that are reliable and robust for micro- and nanoscale manipulation. Surgical robots for medical automation require advanced control methods for real-time complex mechanism control. In this talk, we will present a new event-based two degree-of-freedom control method for micro-/nanoscale systems based on differential flatness. Compared with traditional time-based feedback control, the proposed method shows great potential in dealing with measurement noise and unexpected disturbances. Applications to drug delivery demonstrate the promising robustness of the approach.
About the Speaker

Prof. Tzyh Jong TARN is currently a Senior Professor in the Department of Electrical and Systems Engineering at Washington University, St. Louis, and is the director of the Center for Quantum Information Science and Technology at Tsinghua University, Beijing. He also served as the distinguished chair professor in the Department of Physics at National Cheng Kung University, Taiwan, 2010-2011. As an active member of the Robotics and Automation Society, Dr. Tarn is a Fellow of IEEE and an IFAC Fellow. Dr. Tarn served as the President of the IEEE Robotics and Automation Society, 1992-1993, the Director of the IEEE Division X (Systems and Control), 1995-1996, and a member of the IEEE Board of Directors, 1995-1996.

He is the first recipient of the Nakamura Prize at the 10th Anniversary of IEEE/RSJ IROS in Grenoble, France, 1997, the recipient of the prestigious Joseph F. Engelberger Award of the Robotic Industries Association in 1999, the Auto Soft Lifetime Achievement Award in 2000. He also is the recipient of Pioneer in Robotics and Automation Award in 2003, and the George Saridis Leadership Award in 2009. Both are from the IEEE Robotics and Automation Society. In 2010 he received the Einstein Chair Professorship Award from the Chinese Academy of Sciences and the John R. Ragazzini Award from the American Automatic Control Council. He was featured in the Special Report on Engineering of the 1998 Best Graduate School issue of US News and World Report and his recent research accomplishments were reported in the “Washington Times”, Washington D.C., the “Financial Times”, London, “Le Monde”, Paris, and the “Chicago Sun-Times”, Chicago, etc.

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All are welcome!