

## Title: Compliant Motion Control of Robotic Manipulators

### Abstract:

Achieving compliant motion capabilities in robotic manipulators opens up much more applications and paves the way for robots operating in human environments. Compliant motion involves the control of both force and motion, thereby allowing the robot to comply with unknown and unstructured environments. This talk presents one of the most advanced control algorithms for compliant motion control, i.e., operational space control, and our recent enhancements to improve its performance. The knowledge of the robot dynamics is critical to such advanced control algorithms. This talk will therefore also cover the procedure for identification of robot dynamics, and friction modeling will be briefly covered. The talk concludes with a discussion on practical issues real-time experimental results.



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**Marcelo H. Ang, Jr.** received the B.Sc. degrees (*Cum Laude*) in Mechanical Engineering and Industrial Management Engineering from the De La Salle University, Manila, Philippines, in 1981; the M.Sc. degree in Mechanical Engineering from the University of Hawaii at Manoa, Honolulu, Hawaii, in 1985; and the M.Sc. and Ph.D. degrees in Electrical Engineering from the University of Rochester, Rochester, New York, in 1986 and 1988, respectively. His work experience includes heading the Technical Training Division of Intel's Assembly and Test Facility in the Philippines, research positions at the East West Center in Hawaii and at the Massachusetts Institute of Technology, and a faculty position as an Assistant Professor of Electrical Engineering at the University of Rochester, New York. In 1989, Dr. Ang joined the Department of Mechanical Engineering of the National University of Singapore, where he is currently an Associate Professor. He also holds a joint appointment with the Division of

Engineering and Technology Management as Deputy Head. In addition to academic and research activities, he is actively involved in the Singapore Robotic Games as its founding chairman. He also chaired the Steering Committee for the World Robot Olympiad (2008-2009), and the Mechatronics (1996, 1998) and Mobile Robotics (2006, 2008, 2010) categories of World Skills Singapore. His research interests span the areas of robotics, mechatronics, and applications of intelligent systems methodologies. He teaches both at the graduate and undergraduate levels in the following areas: robotics; creativity and innovation, applied electronics and instrumentation; advanced computing; product design and realization, and special topics in mechatronics. He is also active in consulting work in these areas.