



Modelling and Control of High Density Data Storage Mechatronic Servo Systems: A Case Study with Hard Disc Drives

**Wednesday, 12th December, 2007
4:00pm – 5:00pm
Rm 420 General Purpose South Building
University of Queensland**

Presented by: Dr. Justin Pang, Central Research Laboratory, Hitachi Ltd. Japan

Track densities in magnetic recording demonstrations for future Hard-Disc Drives (HDDs) are projected to exceed 500,000 Tracks-Per-Inch (TPI) in the year 2007 and are still increasing. However due to the renowned superparamagnetic limitation in magnetic recording physics, data storage industries are venturing into dual-stage actuator systems, i.e. appending a secondary actuator onto the current primary actuator (the Voice Coil Motor (VCM)), for high density nanometre scale recording.

This seminar will commence with a short overview of hard disc drives. This will be followed by an introduction to the servo technologies that are currently used. The use of novel control topologies incorporating multi and self-sensing (employing the actuator as a sensor simultaneously) sampled-data servo systems are proposed. Specific consideration will be given to sensor fusion issues for actuator-sensor collocation. Improved track-following performance in piezoelectric-actuated storage systems is achieved with stronger disturbance rejection capabilities. The robustness of the proposed control algorithms, and their ability to fulfil the data storage demands required for future consumer's mobile electronic devices, is also improved. The seminar will conclude with a discussion on some open problems faced by HDD industries as well as HDD servo control benchmark problems proposed by academia.

Biography

Chee Khiang (Justin) Pang (S'04-M'07) was born in Singapore. He received the B.Eng. (Hons.), M. Eng., and Ph. D. degrees, all in electrical and computer engineering, from the National University of Singapore (NUS). From February to June 2003, he was a Visiting Scholar in the School of Information Technology and Electrical Engineering, University of Queensland. During this time he was investigating the probabilistic small signal stability of large-scale interconnected power systems. This work was funded by the Electric Power Research Institute (EPRI), Palo Alto, CA, USA.

Since April 2006, he has been with Storage Technology Research Centre, Central Research Laboratory, Hitachi, Ltd., Fujisawa, Kanagawa, Japan.

His current research interests include vibration analysis and servo control in sampled-data mechatronics, multisensing and active control in Hard Disc Drives (HDDs), and the Self Servo-track Writing (SSW) process.

ALL VISITORS ARE WELCOME

CPD POINTS:1