SEMINAR NOTICE

Preston M. Green Department of Electrical and Systems Engineering

MULTI-CHANNEL DECOUPLING OF QUANTUM MECHANICAL CONTROL SYSTEMS

DISSERTATION DEFENSE
By

Pei-Lan Liu
DSc Candidate

Preston M. Green Department of Electrical and Systems Engineering
Washington University in St. Louis

Abstract: The control of quantum multipartite mechanical systems is an emerging research topic in the quantum field due to the rapid development of technologies such as solid state physics and quantum optics. In this dissertation, we propose a quantum multi-channel decoupling methodology that facilitates the control of quantum multipartite mechanical systems and the design of complex quantum networks. Our approach uses bilinear input affine system models to express desired quantum control systems. This setting allows us to adopt various useful techniques from modern control theory, with some non-trivial modifications. In the quantum realm, we deal with the domain problem, and therefore the decoupling control of infinite-dimensional quantum systems is also included in our work. Our analysis is based on the operator algorithm, whose nature is the matrix operation. For quantum multipartite mechanical systems, the whole system's dimension is the product of all the single components' dimensions, yet in classical systems it is simply the sum of them. Thus, we use the tensor product method to analyze and design quantum multipartite mechanical systems. We give the conditions under which quantum multi-channel decoupling can be achieved and design the feedback control law.

DATE: **Thursday, August 21, 2014**
TIME: **1:30 pm**
PLACE: **Green Hall, Room 0120**

Dissertation advisor:
Dr. Tzyh-Jong Tarn

This seminar is in partial fulfillment
of the Doctor of Science degree

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