

SEMINARS AT NTUA

SPEAKER

PROFESSOR HISHAM ABOU-KANDIL
ECOLE NORMAL SUPERIEURE DE CACHAN
PARIS, FRANCE

FIRST SEMINAR

DATE: MONDAY 12 MARCH 2012
TIME: 10:30 AM-2:00PM
PLACE: MULTIMEDIA AMPHITHEATER

TITLE

ROBUST CONTROL AND GAME THEORY

ABSTRACT

Differential game theory tackles the problem of decision-making when several controllers (or players, or decision makers) are acting on the same dynamical system and may have conflicting objectives. When the players lack information or assume aggressive strategies from their opponents, they usually adopt a cautious strategy to protect themselves while trying to optimize their own objective function. In a robust control approach, uncertainties, neglected dynamics and perturbations are included in the systems model and the challenge is to design the best control that could lead to acceptable performance in all cases. This could lead to over conservative control actions. Although both approaches deal with partially unknown models, the technical treatment is quite different.

In this talk, the basic concepts of game theory are recalled and the main strategies are introduced for the case of linear systems with quadratic performance indices. Some difficulties, open questions and links to robust control are pointed out. It is shown that generalized Riccati equations play an important role and could be used to design robust controls inspired by differential game strategies.

SECOND SEMINAR

DATE: TUESDAY 13 MARCH 2012
TIME: 10:30 AM-1:30PM
PLACE: MULTIMEDIA AMPHITHEATER

TITLE

ACTIVE VIBRATION DAMPING CONTROL FOR LIGHT FLEXIBLE MECHANICAL STRUCTURES

ABSTRACT

Vibrations in mechanical structures are one of the principle factors for crack occurrence in mechanical structures (airplanes, satellites, bridges.) In this talk, piezoelectric actuators and sensors are used to damp vibrations in light flexible structures. To achieve an efficient control action, a model representing the interactions between piezoelectric patches and the structure is developed. The optimal positioning of actuators and sensors is then examined using controllability and observability properties of the system. A control algorithm is then developed based on pole placement and energy dissipation considerations. Examples are given for the case of clamped beam and plate.

THIRD SEMINAR

DATE: TUESDAY 13 MARCH 2012
TIME: 2:00 PM-4:00PM
PLACE: MULTIMEDIA AMPHITHEATER

TITLE

STUDYING IN FRANCE AND IN ENS CACHAN PRESENTATION OF THE FRENCH EDUCATION SYSTEM

ABSTRACT

This informal talk is addressed to students who are interested in spending at least one semester studying in France at a Master's or Doctorate level. The French education system is explained and some programs for financing non-French students are presented.

Professor Hisham ABOU-KANDIL received the "Doctorat d'Ingenieur" degree in Control Engineering from Paris-Sud University, Orsay, France in 1981 and the "Doctorat d'Etat" degree in Control and Signal Processing from Pierre and Marie Curie University, Paris, France in 1986.

Between 1981 and 1990, he was with the Electronics and Control Engineering Department, Pierre and Marie Curie University, Paris, as an Assistant then as an Associate Professor. Since 1990, he is a Professor of Automatic Control at Ecole Normale Superieure, Cachan, France. His research interests include robust control, automation, differential games, optimal control and optimization. He is the author of 4 books and more than 130 journal and conference papers dealing with different aspects of Control Theory and Control Engineering. He served as a scientific counselor for the French Ministry for Research and Higher Education (1996-1998) and for the National Center of Scientific Research (CNRS) between 2001 and 2003. He also served as Vice Rector of Ecole Normale Superieure, Cachan, France, between 2003 and 2008. From 2009 till 2011 he was a Senior Scientific Officer with the National Research Agency, France.

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