UNIVERSITÀ DEGLI STUDI
DI PERUGIA

DICA
DIPARTIMENTO DI INGEGNERIA
CIVILE E AMBIENTALE
DIPARTIMENTO DI ECCELLENZA

CIVIL AND ENVIRONMENTAL ENGINEERING

DOCTORAL PROGRAM

SPECIAL COURSE ON CONTROL OF FLEXIBLE STRUCTURES

Instructor: Yoram Halevi, Professor, Technion - Israel Institute of Technology

Course Description: This special course is a short version of a course with a similar title offered by the instructor at The Technion. It covers both introductory and advanced topics in active control of structures. The course is organized in six consecutive modules leading from fundamental results of dynamical systems and feedback control theory to state of the art results in the field. At the end of the course, students will be capable of analyzing and designing control systems for rigid and elastic structures.

Evaluation: Students will be evaluated through a take-home exam (65%), and a critical report of a research paper (35%).

February, 3rd 2020

Module 1: Introduction to dynamical systems
9:00-12:00 Transfer functions and state space models, stability, steady state and transient performance, frequency response.
Module 2: Flexible systems
12:00-13:00 Free and forced response of single degree of freedom (dof) system.
14:30-16:30 Damping, matrix second order models of multi-dof systems, modal analysis, controllability and observability.

February, 4th 2020

Module 3: Active control
9:00-12:00 Architecture, closed loop stability, stability margins, steady state, state feedback, observers.
Module 4: Optimal control
12:00-13:00 Definition, principles.
14:30-16:30 General solution, linear quadratic regulator (LQR), minimum time.

February, 5th 2020

Module 5: Dedicated methods
9:00-13:00 Modal control, dynamic vibration absorber.
14:30-16:30 Active mass damper, input shaping.

February, 6th 2020

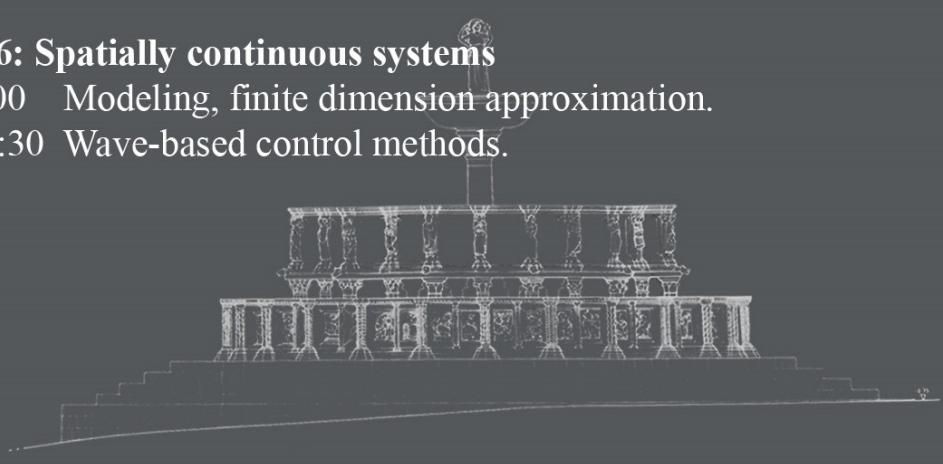
Module 6: Spatially continuous systems
9:00-13:00 Modeling, finite dimension approximation.
14:30-16:30 Wave-based control methods.

Yoram Halevi is the James H. (Jimmy) Belfer Professor in the Faculty of Mechanical Engineering at the Technion, Israel Institute of Technology. He received his D.Sc. degree in Mechanical Engineering from the Technion in 1985. He held visiting positions at Penn State, Ohio State and Virginia Tech in the US and in CNR-ITIA in Milan, Italy as well as short term visits to other universities and research institutes. His public activities include serving as President of Israel Association of Automatic Control, Chair of ASME Europe conference committee and Dean of the Faculty of Mechanical Engineering, Technion.

Yoram Halevi's current research interests are in control of flexible structures, optimal control of redundant actuation systems, model order reduction, model updating and structural health monitoring. Yoram Halevi is a Fellow of ASME.

Location: Campus of Engineering of University of Perugia
Latitude: 43.118177 Longitude: 12.357942

Timetable: February 3-6, 9:00 a.m. - 4:30 p.m.,
Room 10



For more info: Ph.D. Program Secretariat (Mrs. Giuliana Steri, giuliana.steri@unipg.it)
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