



COMMANDE MULTI-ACTIONNEURS MULTI-CAPTEURS

MULTI-SENSOR, MULTI-ACTIVATOR CONTROL

Lecturers: Gérard SCORLETTI, Catherine MUSY, Eric BLANCO

| Lecturers : 12.0 | TC : 18.0 | PW : 4.0 | Autonomy : 14.0 | Study : 0.0 | Project : 0.0 | Language : FR

Objectives

Performance requirements in technological systems have led to the use of advanced control laws dedicated in the past to high-tech systems for everyday systems (automotive, subway, building or irrigation canal). Actual industrial challenges lead to highly tight specifications, for more and more complex processes, with shorter and shorter conception times. An important issue is therefore to design controllers for systems with several actuators and several sensors, so called multivariable systems (piloting aircraft, space launchers). Prerequisite for the Master "Automatic Control Engineering" and basis for the "Aeronautics", "Energy" and "Ground Transportation" options.

Keywords : Automatic control, State space representation, State/output feedback, multivariable control, observers

Programme

- Modelling and analysis of dynamic using state-space approach.
- Introduction to non linear-systems analysis.
- Modal control (pole assignment).
- Observer and virtual sensor.
- Disturbance rejection and Set-point change.
- Cases studies.

Learning outcomes

- Analyze the static and dynamic behaviour of a system.
- Design a modal controller.
- Design a multivariable control ensuring a set of specifications.
- Design an observer by a modal approach.

Independent study

Objectifs : Develop an engineering design procedure by relying on the knowledge acquired during the AF.

Méthodes : Solve a practical and original control problem in the presence of non-linearities by applying the methods and tools acquired during the AF.

Core texts

G. SCORLETTI, *COMMANDE MULTI-ACTIONNEURS MULTI-CAPTEURS*, Polycop ECL, 2014
R.C. DORF and R.H. BISHOP *MODERN CONTROL SYSTEMS*, Pearson Prentice Hall, 2005
G. F. FRANKLIN, J. D. POWELL and A. EMAMI-NAENI *FEEDBACK CONTROL OF DYNAMIC SYSTEMS*, AddisonWesley, 1986

Assessment

Individual written final test 2 hours (knowledge) and individual oral evaluation of autonomy (know-how).
Final AF mark = $2/3 \cdot K + 1/3 \cdot KH$.