GENERAL SEMINARS - April 2018

Wednesday 04 april 2018

10H - 11H

Speaker : Dr Vincent MONWANOU

Title : Chaotic motions in a forced mixed Rayleigh-Liénard oscillator with periodically external and parametric excitations

Abstract : This talk addresses the issues of a mixed Rayleigh-Liénard oscillator with periodically external and parametric excitations. The Melnikov method is utilized to analytically determine the domains boundaries where horseshoes chaos appears. Routes to chaos are investigated through bifurcations structures, Lyapunov exponent, phase portraits and Poincaré section. The effects of Rayleigh and Liénard parameters are analyzed. Results of analytical investigations are validated and complemented by numerical simulations.

Wednesday 11 april 2018 : 2 seminars

1st seminar : 10H - 11H

Speaker : Jules DEGILA, IMSP, Bénin. Jules.degila@imsp-uac.org

Title : Design and optimization of multidimensional photonic agile networks

Abstract : This talk deals with the topological design of a yotta-bit-per-second (1 yotta = 1024) multidimensional network. The YottaWeb is a proposed architecture based upon agile optical cores that provides fully meshed connectivity with direct op-tical paths between edge nodes that are electronically controlled. In order to arrange the edge nodes around the agile cores (ACs) into a suitable and efficient YottaWeb, one proposal is to create a multidimensional lattice structure of ACs.
The problem of designing such a structure is highly combinatorial. In this talk, we present the problem, called the nodal arrangement problem, and we propose a meta-search procedure based on Tabu and VNS to solve it. The performance of the algorithm is gauged using a set of randomly generated networks with different distribution of traffic.

2nd seminar : 11H - 12H

Orateur : Charles-David GONÇALVES, IMSP, Bénin. olatundeg@gmail.com

Titre : Influence de l'épaisseur de pièces moulées par microinjection sur les propriétés mécaniques mesurées en analyse mécanique dynamique (DMA)

Résumé : le remplissage de pièces en polymères moulée par micro-injection nécessité des condition de mise en œuvre extrême qui génèrent de nombreuses contraintes lors du processus. Elle génèrent alors des gradient de morphologie dans les pièces qui sont responsables de propriétés mécaniques différentes. Afin de mieux comprendre ces structures, les propriétés thermomécaniques sont étudiées à l'aide de l'analyse mécanique dynamique.

Wednesday 18 april 2018

10H - 11H

Speaker : Eric SOUTIL, CNAM, France. Eric.Soutil@cnam.fr

Title : Non-convex Quadratic Integer Programming : a piecewise linearization

Abstract : We address in this talk Non-convex Quadratic Integer Programming (NCQIP). More precisely we consider a problem in which the objective function is a quadratic non-convex one with pure general integer variables and linear constraints. The method proposed here generalizes a previous work addressing Convex QIP.
We propose a general method to solve such problems that first transforms the problem into a mixed separable one, still non-convex. The quadratic part of the objective function becomes a weighted sum of squared variables, with no more products of two variables. This first transformation is done by diagonalizing the Hessian matrix of the initial objective function and requires new real variables and linear number of added constraints. Then we propose to use a parametric piecewise linearization of the equivalent problem. This linearization allows us to find the optimum of the initial problem when the number of line segments asymptotically grows. Experimentations are presented, in both convex and non-convex context, and extensions to quadratic constraints are discussed.

Keywords: Quadratic Programming, Integer Variables, Piecewise Linearization.

Mercredi 25 avril 2018

10H - 11H

Speaker : Jean-Michel CORON, Université Pierre et Marie Curie de Paris, France.
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Title : How the nonlinearities can be used to control a system

Abstract : A control system is a dynamical system on which one can act thanks to what is called the control. For example, in a car, one can turn the steering wheel, press the accelerator pedal etc. These are the control(s). One of the main problems in control theory is the controllability problem. It is the following one. One starts from a given situation and there is a given target. The controllability problem is to see if, by using some suitable controls depending on time, the given situation and target, one can move from the given situation to the target. We study this problem with a special emphasis on the case where the nonlinearities play a crucial role. In finite dimension in this case a key tool is the use of iterated Lie brackets as shown in particular by the Chow theorem. This key tool gives also important results for some control systems modeled by means of partial differential equations. However we do not know how to use it for many other control systems modeled by means partial differential equations. We present methods to avoid the use of iterated Lie brackets. We give applications of these methods to the control of various physical control systems (Euler and Navier-Stokes equations of incompressible fluids, 1-D hyperbolic systems, heat equations, shallow water equations, Korteweg-de Vries equations, Schroedinger equations...) and to the stabilization problem, another of the main problems in control theory.