CURRICULUM VITÆ

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Date of Birth: **1969**

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Education

Ph.D. in applied mathematics: **Automatic & Control Theory**: Under the supervision of Professor **G. SALLET**. University of Metz-France: December 1995.
Dissertation title: *Contribution to global stabilization of nonlinear systems.*

D.E.A (Diplome d'etude approfondies) in applied mathematics. University of Metz-France: June 1992.

Maitrise (M.Sc) in applied mathematics: **Numerical Analysis**. University of Marrakech-Morocco: May 1991.

Awards

Science prizewinners 1996 of **National Academy of Science-Metz**, awarded for the best dessertation.

Professional experience

1995-1997: Research and teacher assistant University of Metz.

Research Interests

Nonlinear control systems: Stabilization, observability and observers. Stabilization in probability of nonlinear control stochastic systems.

Book

I was writing a book on nonlinear stochastic systems that will be published by *Marcel Dekker INC* edition.

Journal Articles

[1] M. Oumoun and J. C. Vivalda. On the stabilization of a class of bilinear systems in 3–space, *European Journal of Control.* **2** (1996) 193–200.

[2] E. Perrin, A. Mandrille, M. Oumoun, C. Fonteix and I. Marc. Optimisation globale par stratégie d'évolution: Technique utilisant la génétique des individus diploïdes, *RAIRO. Recherche opérationnelles/Operations Research.* vol. **31**,n 2 (1997) 161–201.

[3] R. Chabour and M. Oumoun. A Jurdjevic–Quinn Theorem for stochastic nonlinear systems, *Journal Stochastic Analysis & Applications.* vol. **16**,n 1 (1998) 43–50.

[4] R. Chabour and M. Oumoun. On A universal formula for the stabilization of control stochastic nonlinear systems, *Journal Stochastic Analysis & Applications.* vol. **17**, n 3 (1999) to appear.

[5] M. Bensoubaya, R. Chabour, A. Ferfera and M. Oumoun. Stabilization of stochastic nonlinear control systems, *SIAM Journal of Control & Optimization*, (submeted).

[6] M. A. Hammami, M. Oumoun and J. C. Vivalda. Stabilization and observer for nonlinear systems, *European Journal of Control,* (submeted).

Conferences

[7] M. Oumoun. Feedback stabilization of homogeneous systems of odd degree. *Proc.* $3^{\mathbf{rd}}$ *IEEE Mediterranean Symposium on New Directions in Control & Automation, Limassol, Cyprus, July 11-13, 1995.* vol. **2**, pages: 367–370.

[8] M. A. Hammami, M. Oumoun and J. C. Vivalda. Observers for homogeneous systems of odd degree, *IFAC-CIS 97 Belfort, france, Mai 20-23, 1997.*

[9] O. Chabour and M. Oumoun. Global stabilization of partially linear stochastic systems. *Proc. 17th IASTED International Conference on Modelling, Identification, and Control, Grindelwald, Switzerland, February 18-20, 1998*, pages: 22–24.

[10] O. Chabour, M. Oumoun and G. Sallet. On the global stabilization of cascade stochastic systems. *37th IEEE Conference on Decision and Control, Tampa, Florida, USA, December 16-18, 1998* (accepted).

Abstract of works

In [1], we investigate the stabilization of a class of homogeneous bilinear system $\dot{x} = Ax + uBx$ in $\mathbb{R}^3$. We consider the problem of explicitly constructing feedback laws that are homogeneous and analytic in $\mathbb{R}^3 \setminus \{0\}$ and that asymptotically stabilize the above bilinear systems. The fundamental idea is that if a vector field X (defined on $\mathbb{R}^3$) is homogeneous, then it induces a dynamical system on a lower dimensional space: the sphere S^2. The main tool to construct homogeneous feedbacks has the theorem of Coleman which gives necessary and sufficient conditions for the global asymptotic stability of a homogeneous system in $\mathbb{R}^3$.

[2] In this paper, a new algorithm for global optimization, based on a genetic algorithms and evolution strategies, is presented. This class of algorithms is characterized by a stochastic search on sets of points and uses natural adaptive population ability. A demonstration of asympyoyic convergence is provided. Then, the influence of the parameters is evaluated showing the great importance of homozygocity rate and the nature of the dominance.

In [3][4] We give a stochastic version of the well-known Jurdjevic-Qiunn's theorem and Arstein's one for the global asymptotic stabilization of affine control nonlinear systems of the form:

$$x_t = x_0 + \int_0^t \Big(X_0(x_s) + \sum_{j=1}^m u_j Y_j(x_s)\Big) ds + \int_0^t X(x_s) dw_s + \sum_{j=1}^m \int_0^t u_j Z_j(x_s) d\tilde{w}_s^j$$

The stochastic Jurdjevic-Qiunn's theorem is generalised in [5] to nonaffine control sochastic systems of the form:

$$x_t = x_0 + \int_0^t X_0(x_s, u) + \int_0^t X(x_s, u) dw_s$$

In [7] We study homogeneous systems of odd degree of the form:

$$d(x(t))/dt = f(x(t)) + Bu$$

Where f is a homogeneaus vector field of odd degree and B is a $n \times m$ canstant matrix. A necessary and sufficient condition of stabilization by means of homogeneous feedbacks of the same odd degree as the vector field is given. This result generalizes the one of Andreini, Bacciotti and Stefani. In [8] we propose an observer for these systems when the output is linear and in [6] we study the stabilization, of the same system, through an observer.

The main object of the paper [9] (respectively [10]) is to provide sufficient conditions for the global asymptotic stabilization in probability, of composite partially linear stochastic systems (respectively of cascade stochastic systems).

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