

Part A. PERSONAL INFORMATION		CV date	09/20/2018
First and Family name	Carles BATLLE ARNAU		
Social Security, Passport, ID number	DNI: 77295184G	Age	57
Researcher numbers	Researcher ID	A-7800-2008	
	Orcid code	0000-0002-6088-6187	

A.1. Current position

Name of University/Institution	Universitat Politècnica de Catalunya (UPC)		
Department	Department of Mathematics		
Address and Country	EPSEVG, Av. V. Balaguer 1, Vilanova I la Geltrú, 08800 Spain		
Phone number	938967713	E-mail	carles.batlle@upc.edu
Current position	Titular de Universidad (Associate Prof.)	From	1993
Espec. cód. UNESCO	3304.12, 1203.26, 2212.14		
Palabras clave	theoretical mechanics, control and system theory		

A.2. Education

5-year degree in Physics	Universitat de Barcelona	1984
PhD in Physics	Universitat de Barcelona	1988

A.3. JCR articles, h Index, thesis supervised...

- 41 JCR papers, 1 non JCR paper, 40+ conference communications, 2 chapters in monographs.
- ResearcherID: h=11, 70 papers, 456 cites, 8.44 cites per paper.
- 6 PhD thesis (co-)supervised, 2 more underway.
- 4 Spanish government research evaluations ("sexenios") (last one in 2015).
- Most relevant publications (prior to last 5 years):
 1. C. Batlle, J. Gomis, J.M. Pons, N. Román, Equivalence between the Hamiltonian and Lagrangian formalisms for constrained systems, J. Math. Phys. 27, 2953-2962 (1986). JCR 1986: 1.012 (4 of 6 (Physics, Mathematical))
JCR citations: 87, Google Scholar: 147
 2. C. Batlle, J. Gomis, J.M. Pons, N. Román, Lagrangian and Hamiltonian constraints for second order singular Lagrangians, J. Phys. A21, 2693-2703 (1988). JCR 1988: 1.926 (14 of 64, (Physics))
JCR citations: 36, Google Scholar: 70
 3. C. Batlle, E. Fossas, G. Olivar, Stabilization of periodic orbits of the buck converter by time-delayed feedback, Int. J. of Circuit Theory and Applications 27, 617-631 (1999). JCR 1999: 0.597 (86 of 205, (Engineering, Electrical & Electronic))
JCR citations: 63, Google Scholar: 98
 4. C. Batlle, E. Fossas, I. Merillas, A. Miralles, Generalized discontinuous conduction modes in the complementarity formalism, IEEE Trans. Circuit & Systems II 52, 447-451 (2005). JCR 2005: 0.661 (110 de 208, Q2 (Engineering, Electrical & Electronic))
JCR citations: 9, Google Scholar: 21
 5. C. Batlle, A. Dòria, G. Espinosa-Pérez, R. Ortega, Simultaneous interconnection and damping assignment passivity-based control: the induction machine case study, Int. J. of Control 82, 241-255 (2009). JCR 2009: 1.124 (29 of 59, (Automation & Control Systems))
JCR citations: 21, Google Scholar: 29
 6. C. Batlle, I. Massana, E. Simó, Representation of a general composition of Dirac structures, Proc. of the 50th IEEE Conference on Decision and Control and European Control Conference 2011, Orlando, FL, December 12-15 2011, pp. 5199-5204 (2011). JCR citations: 4, Google Scholar: 6

Part B. CV SUMMARY (max. 3500 characters, including spaces)

I have been doing scientific research for 30+ years, and teaching at university level for 25+ years. My areas of expertise are theoretical physics, mainly in analytical mechanics and field theory, and control and system theory, with focus in modelling and control of interconnected systems and with application to reduction theory and electromechanical and fuel cell systems, and I am familiar with a wide spectrum of applied mathematical techniques.

I have co-authored nearly 80 papers in JCR journals and international conferences, and I have (co-)advised 6 PhD thesis. I have been involved in 20+ competitive research projects, of which I have been the PI in 4, and in 3 industry technological projects, in one of which I was the leading academic.

My research has received 450+ citations (excluding any self-citation by the co-authors). A detailed account of the cites can be found in the appendices of the file
<https://mat-web.upc.edu/people/carles.batlle/curriculum.pdf>

I usually review around 10 papers per year for journals and conferences in the field of control and system theory, and I served as associate editor for Control Engineering Practice from 2008 to 2017.

I have taught many courses at the School of Engineering of Vilanova i la Geltrú, the Institute of Control and Industrial Engineering (IOC), the Faculty of Mathematics and Statistics (FME) and School of Telecommunications Engineering (ETSETB), of all them at UPC, both at the undergraduate and graduate levels. A more detailed account is presented in
<https://mat-web.upc.edu/people/carles.batlle/>
and the teaching materials that I have authored can be found in
<https://www.dropbox.com/home/publications/teaching>

My field of expertise in theoretical mechanics is focused in the computation and analysis of symmetries of non-relativistic and relativistic models of particles and strings. This is a continuation of my PhD work in the 80s, when I contributed to some papers which established some general results about constrained Lagrangian and Hamiltonian models, and which are still widely cited.

I started my research in control and system theory with the analysis and control of the chaotic systems that appear in power electronics. Afterwards, I moved to the modelling of systems in the framework of the port-Hamiltonian formalism, and made some well-known contributions to control of electromechanical devices. In the last years, I have centered my research in this field in model reduction theory, with fuel cells being the main area of application.

Part C. RELEVANT MERITS (last 5 years)

C.1. Publications (including books)

12 JCR papers in 2013-2017, of which the most relevant are:

1. M. Sarmiento, M. Serra, C. Batlle, Distributed parameter model simulation tool for PEM fuel cells, International J. of Hydrogen Energy **39**, 4044-4052 (2014).
JCR 2014: 3.313 (47 de 136, Q2 (Chemistry, Physical))
JCR citations: 6, Google Scholar: 13
2. Ha B. Minh, C. Batlle, E. Fossas, A new estimation of the lower error bound in balanced truncation method, Automatica **50**, 2196-2198 (2014).
JCR 2014: 3.920 (5 de 58, Q1 (Automation & Control Systems))
JCR citations: 6, Google Scholar: 16

3. N. Carrero, C. Batlle, E. Fossas, Averaged dynamics of a coupled-inductor boost converter under sliding mode control using a piecewise linear complementarity model, *IMA J. Appl. Math.* **81**(4), 688-698 (2016).
JCR 2015: 1.034 (84 de 254, Q2 (Mathematics, Applied))
4. C. Batlle, J. Gomis, D. Not, Extended Galilean symmetries of non-relativistic strings, *J. High Energ. Phys.* (2017) 2017: 49.
JCR 2017: 5.541 (4 of 29, Q1 (Physics, Particles & Fields))
JCR citations: 10, Google Scholar: 13
5. C. Batlle, V. Campello, J. Gomis, Canonical realization of (2+1)-dimensional Bondi-Metzner-Sachs symmetry, *Physical Rev. D* **96**, 025004 (2017).
JCR 2017: 4.394 (7 of 29, Q1 (Physics, Particles & Fields))
JCR citations: 3, Google Scholar: 7
6. M.L. Sarmiento-Carnevali, M. Serra, C. Batlle, Distributed parameter model-based control of water activity and concentration of reactants in a polymer electrolyte membrane fuel cell, *Int. J. of Hydrogen Energy* **42** (42), 26389-26407 (2017).
JCR 2017: 4.229 (42 de 145, Q2 (Chemistry, Physical))

C.2. Research projects and grants

1. "Physical bottom up multiscale modelling for automotive PEMFC innovative performance and durability optimization"(PUMAMIND), Commission of European Communities, FP7-303419. PI UPC: Maria Serra (UPC-IRI), 17-12-2012 to 16-12-2015. Amount UPC: 187.047 euro.
2. "Estimación, diagnosis y control para la mejora de la eficiencia y la vida útil de las pilas de combustible tipo PEM" (MICAPEM-IRI), DPI2015-69286-C3-2-R. PI(s): Maria Serra (UPC-IRI) and Ramon Costa (UPC), 2016 to 2019. Amount: 142.000 euro.
3. "Reconeixement i finançament del grup Control Avançat de Sistemes d'Energia," Departament d'Innovació, Universitats i Empresa (Generalitat de Catalunya) 2014 SGR 267. PI: Josep M. Olm (UPC), 2014 to 2016. Amount: 30.000 euro.

C.3. Contracts

C.4. Patents

C.5, C.6, C.7... (e. g., Institutional responsibilities, memberships of scientific societies...)