Hussein OBEID
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Department of Mechanical and Industrial Engineering, Sultan Qaboos University, Oman

Contents

1 Elements of *curriculum vitæ*

Profile

Date of birth: 25 October 1991
Nationality: French
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Education

2015-2018 **Ph.D. in Control Engineering**, *Femto-ST institute, University of Bourgogne Franche-Comté, France.*
Title : *Contribution to adaptive higher order sliding mode controllers and observers: Application to energy management systems.*
Defense date: 5 November 2018.
Supervisors: *Salah LAGHROUCHE, Professor at UTBM, France.*
Leonid FRIDMAN, Professor at UNAM, Mexico.
Mohamed HARMOUCHE, PhD Engineer at Acitility, France.
Jury: *Jean-Pierre BARBOT, Professor at ENSEA, France.*
Franck PLESTAN, Professor at Ecole Centrale de Nantes, France.
Mickael HILAIRET, Professor at Ecole Centrale de Nantes, France.
Christopher EDWARDS, Professor at University of Exeter, United Kingdom.
Yacine CHITOUR, Professor at University of Paris-Saclay, France.

2009-2014 **MSc. in Electrical Engineering**, *Lebanese University, Faculty of Engineering, Lebanon.*

Experience

2024 - present **Assistant Professor**, *Mechanical and Industrial Engineering Department, Sultan Qaboos Unveristy, Oman.*

2020 - 2024 **Associate Professor**, *LUSAC Laboratory and University of Caen Normandy, France.*

2018 - 2020 **Assistant Professor**, *FEMTO-ST institute and UBFC/UFR STGI, France.*

2015 - 2018 **PhD**, *FEMTO-ST (UMR CNRS 6174) and UBFC/UTBM, Funding: Ministerial.* ***University Lecturer for 2 years, UTBM*** *(64h/year).*

10-12 / 2016 **Research Internship,** *Sliding Mode Laboratory, National Autonomous University of Mexico (UNAM), Mexico.*

03-07 / 2014 **Research Internship**, *Doctoral School of Science and Technology - Lebanese University, Lebanon.*

Programming and software

Python, C++, C#, Matlab, Simulink, LabVIEW, Control Desk, ConfigurationDesk, DSPACE, BaSyTec, Arduino-C, Raspberry Pi, CoDeSys 2.3 & 3.5, FESTO & Wago PLC, ...

Languages

English, French, Arabic.

2 Teaching statement

2.1 Teaching Experience

My teaching experience spans over 7 years, during which I have had the privilege of instructing a wide range of courses at both undergraduate and postgraduate levels. These courses cover diverse topics, including Instrumentation and Measurement, Power Electronics, Electrical Machines, Control Systems, and Automation. In total, I have accumulated over 1,200 teaching hours across various formats, such as lectures, tutorials, and hands-on laboratory sessions. This experience has allowed me to engage with a dynamic and diverse student body. The undergraduate courses I have taught include:

- Programming for Engineers
- PLC programming
- Control systems
- Simulation Tools
- Instrumentation and Measurement
- Electromechanical Systems
- Analog Electronics
- Electrical Machines
- Renewable Energies
- Electromagnetic

At the postgraduate level, I have taught Power Electronics and Advanced Engineering Measurement Systems. In addition to my teaching responsibilities, I have actively contributed to the academic and professional development of students through the supervision of internships and apprenticeships.

2.2 Design and Leadership of Course Units

Throughout my career, I have been responsible for several course units, many of which remain active:

- Electromechanical Systems at SQU.
- Instrumentation and Measurement at SQU.
- Advanced Engineering Measurement Systems at SQU.

I have also contributed to the creation of four new modules and the enhancement of content for several existing modules. My contributions include the following:

- Electrical Machines (Course Unit Responsibility: 2018â2019): Developed all course materials and tutorials for this module.
- Electromagnetics (Course Unit Responsibility: 2019â2020): Created comprehensive course materials, tutorials, and practical sessions.
- Renewable Energies: Designed innovative practical activities, including three experimental setups.
- Informatics 1: Created new tutorial materials and contributed to the setup of practical sessions.
- Informatics 2: Organized practical sessions and developed the required experimental setups.
- Informatics 3: Assisted in setting up practical activities and experimental setups.

3 Research statement

The axis that have guided my scientific research for the past 8 years are:

- The study of uncertain/perturbed nonlinear systems: I have conducted different works that focus on finding solutions for the dynamic modelling, control and observation of uncertain nonlinear systems.
- Control, observation, diagnosis and prognosis of electrical systems (electrical machines, wind turbines, co-generation, lithium-ion batteries, fuel cell...). These systems are at the origin of my theoretical and methodological developments.
- Energy management optimization in electric vehicles and microgrids.
- Development of HIL test bench to validate the proposed solutions in real-time.

My research themes focus on the synthesis of advanced control, observer/differentiator and optimization algorithms to meet the technological requirement in the field of electric mobility and renewable energies. They can be divided into four interactive areas:

- Adaptive higher order sliding mode controllers and observers.
- Robust and adaptive control/observer of electrical machines for energy conversion systems.
- Diagnosis and prognosis of energy storage systems.
- Energy management for electric vehicles and Microgrids.

3.1 Adaptive higher order sliding mode controllers and observers

Sliding Mode control is a well-known method for controlling nonlinear uncertain systems, renowned for its insensitivity to parametric uncertainty and external disturbances. However, the implementation of such controllers requires the knowledge of the bound of the uncertainties, which is unknown in many cases, especially in practical systems. Recently, the concept of adaptive sliding mode control seems to deal with this drawback. The subject of my thesis was concerned with the proposition of novel adaptive strategies which can be applied to higher order sliding mode controllers and observers.

3.1.1 Barrier function-based approach

Controller:
I have proposed different adaptive sliding mode controllers of orders 1-2-n for a class of disturbed nonlinear systems. The main contribution was the design of an adaptive strategy **"Barrier function"** that can ensure the convergence of the sliding variable to a predefined neighborhood of zero without overestimating the adaptive gain and without requiring any information on the bound of the uncertainties which affect the system. This adaptive strategy is then applied for the design of first order, second order, integral and higher order sliding mode control algorithms.

Observer:
In order to implement the higher order sliding mode control algorithms, information about the states should be available. A well-known solution for this problem is to use the sliding mode algorithms to design observers that can estimate the unavailable states and/or disturbances. However, observers' and differentiators' design needs the information on the bound of disturbances. To deal with this problem, the barrier function-based strategy has been used to design an adaptive version of the

sliding mode observer/differentiator.

3.1.2 Neural Networks-based higher order sliding mode approach

This work presents a neural networks-based higher-order sliding mode control strategy for a disturbed chain of integrators of order n whose disturbance is smooth and bounded with unknown upper bound. This strategy ensures the convergence of the system states to a vicinity of the origin without requiring any information on the upper bound of the disturbance. It consists in applying a neural networks-based disturbance estimation methodology to compensate the disturbance with some error, and a higher-order sliding mode control algorithm which just needs to counteract this error and ensures the stabilisation of the system states. The main advantage of this strategy is that it does not require neither the usage of the equivalent control nor the usage of the integral sliding mode algorithm.

3.2 Robust and adaptive control/observer of electrical machines for energy conversion systems

Distributed energy resources are usually considered as uncertain and complex systems. The complexity comes from the nonlinear system dynamic, parameter uncertainties and external perturbations. Thus, the controllers/observers that we have developed have been used to respond to the technological issues of these resources. My contributions in this field are detailed below.

3.2.1 Control and observation of linear induction motor for cogeneration system

- Collaboration included in this topic: L. ZHANG (2017-2021).

The system under study is a linear induction generator integrated into a micro-cogeneration system powered by a Stirling engine. The Striling engines convert thermal energy into mechanical energy with translational motion. Hence, the use of the linear induction machine as a generator appears more natural and practical than a rotating machine, resulting in the elimination of gearboxes, increased device efficiency, and improved reliability.
The significant difficulty in controlling the linear induction motor comes from the end effects phenomena, which play an essential role in the system's dynamic. Indeed, this phenomenon significantly increases the non-linearity in the model and generates several difficulties in control and observation problems. During this collaboration, we addressed three critical issues to meet the objective: robust control of the linear induction motor, estimation of the speed and the flux of the linear induction motor and observer-based robust control (without mechanical sensors) using the higher-order sliding mode approach.

3.2.2 Control of a fixed wind energy conversion system

The main focus of this work is to develop a robust control algorithm for a fixed wind energy conversion system. The considered system is based on a Doubly Fed Induction Generator, and the control tasks are to regulate the active power to track the maximum power obtained by the maximum power point tracking controller and control the reactive power to track the reference reactive power. The specific feature of the wind energy conversion system is that its model is a nonlinear system with uncertainties whose upper bound is also unknown. Hence, we have applied our proposed adaptive second order sliding mode algorithm to control the active and the reactive power. The performance and the robustness of the proposed controller have been validated using MATLAB/Simulink.

3.2.3 Control of a floating Offshore wind turbine

- Collaboration included in this topic: H. BASBAS (2020-present).

Floating offshore wind turbines present real challenges in terms of modeling and control. In this context, this work aims to develop robust model-based control approaches for the 5MW tensioned-leg platform floating offshore wind turbines. The control objectives are to regulate the rotor speed to its nominal value and to reduce the fluctuations of the platform pitch angle.
The first contribution of this work is the development of a nonlinear control-oriented model for the 5 MW tensioned-leg platform based on the adaptation of the nonlinear aerodynamic equations. Then, thanks to the proposed model, different higher-order slding mode control algorithms have been designed and validated using OpenFAST code in MATLAB/Simulink.

3.3 Diagnosis and prognosis of energy storage systems

This work aims is to improve the integration of energy storage systems such as Lithium-ion batteries and fuel cells into stationary (microgrids) and dynamic applications (hybrid electric vehicles). Although their attractive features, the aging of these storage systems due to different usage profiles (different kind of equipment or loads) is considered as a critical problem since it can affect their performance and safety. Hence, accurate State Of Health (SOH) estimation and Remaining Useful Life (RUL) prediction algorithms are essential to ensure their diagnosis and prognosis. In this context, we have proposed several model-based and data-based approaches that ensure the SOH estimation and the RUL prediction.

3.3.1 State-Of-Charge (SOC) and State-Of-Health (SOH) estimation of Lithium-ion battery

Lithium-ion batteries are becoming the main option of onboard energy storage system for electric vehicles applications, due to their outstanding energy density, high working voltage and low self-discharge rate. As mentioned before, the estimation of their internal parameters, i.e. the SOC and the SOH is an essential task to improve their lifespan. To achieve this task, we have developed a robust nonlinear model-based method that can estimate both parameters.
For SOC estimation, we have presented the electric dynamics model of the Lithuim-ion battery in a canonical form. Then, we have appied a novel approach based on the higher-order sliding mode observer. The performance of the proposed approach is illustrated through a set of experimental data (WLTP profiles). Furthermore, the proposed approach has been implemented on a dSPACE DS1104 real-time board connected to the battery aging test bench to verify its performance in real-time.
For SOH estimation, we have applied an identification algorithm based on the generalized second-order sliding mode observer to identify the battery capacity leading to an accurate SOH estimation. Here again, the high accuarcy of the proposed algorithm is illustrated through a set of experimental data (WLTP profiles).

3.3.2 Fuell cell degradation estimation

- PhD Thesis included in this topic: Y. ZHOU (2017-2021).

Hybrid electric vehicles selecting fuel cell as the main power source are regarded as one of the most promising technologies. Here, again the aging phenomena of the fuel cell should be estimated online to improve its durability. To deal with this problem, and thanks to the fuel cell degradation model,

we have applied the following two model-based approaches: the cubature kalman filter and square root cuabture kalman filter. The accuracy of these two approaches has been tested and validated using a set of experimental data.

3.3.3 Fuell cell degradation prediction

- Master Thesis included in this topic: Y. IMAMVERDIYEV (02/2023-present).

This work focus on the development of data-based approaches to predict the RUL of fuel cell systems. To do that, a data analysis is carried out first in order to extract the indicators related to the degradation of fuel cell systems. Then, several methods based on artificial intelligence (AI) have been proposed: LSTM, ESN and LSTM+ESN. A comparative study between these approaches is underway based on a set of real data.
This work constitutes a first step in the perspective of developing new methods of prognosis for fuel cell systems in interaction with other energy conversion or storage systems (case of a microgrids or electric vehicles). On the other hand, using these algorithms to synthesize adaptive energy management laws to increase the durability of fuel cell systems.

3.4 Energy management for electric vehicles and Microgrids

3.4.1 Energy management of hybrid power systems for electric vehicles

- PhD Thesis included in this topic: Y. ZHOU (2017-2021).

This work aims to develop robust control schemes for hybrid power systems of electric vehicles. In these systems, the battery or the fuel cell is considered as the main power source while the super-capacitors are the auxiliary power source. The control objective to be addressed in such systems is to regulate the DC bus voltage and the SCs voltage to their reference values while smoothing the current of the battery or the fuel cell to improve their lifetime. Moreover, safety constraints all the system components, such as maximum current of the battery or fuel cell and super capacitors, state of the charge of the super capacitors should be taken into account in the design of the control algorithms. In this work, several higher order sliding mode control algorithms have been proposed and validated experimentally using HIL test bench.
This work constitutes a first step in the perspective of synthesizing adaptive control laws and integrating the degradation of the main sources to improve their lifetime.

3.4.2 Global and generic optimization of energy management in a microgrid for telecomunications

- PhD Thesis included in this topic: H. ELAOUNI (2019-present), Y. TOUGZAHOUI (2020-present) and O. HAMZAOUI (2022-present)

The objective of this work is to develop innovative generic solutions for energy management of multi-sites. Each site contains its own hybrid energy system, which combines different renewable energy sources, such as solar photovoltaic (PV), wind, battery, and fuel cell, and it can be connected to the grid. The first task consists in finding the optimal sizing architecture for each site based on minimizing the total cost of the hybrid energy system. The second task is to propose energy management strategies for each site that meet the demand at all times while respecting the constraints of all the system components. And the final task is to manage the energy between these sites to reduce the overall cost of buying the energy from the grid. To achieve these objectives, we have addressed these four issues:

Optimal sizing of one site (grid-connected hybrid system):
The Genetic Algorithm was used and the obtained results have been compared with the ones obtained using the Particle Swarm Optimization algorithm and the HOMER software (A well-known software in sizing) to validate the studied strategy's performance. Moreover, the impact of the site's location on the profitability and the sizing has been studied and compared to show the robustness of the proposed approach.

Optimal energy management for one site:
Several approaches were discussed: (1) energy management based on fuzzy logic, (2) energy management based on Model predictive control combined with linear and nonlinear programming and (3) energy management based on nonlinear programming. These approaches ensure that the load demand is met and the battery State Of Charge (SOC) is maintained within their predefined limits while optimizing the cost of purchasing electricity from the national grid.

Optimal energy management for n interconnected sites:
We have worked on different sites (n sites) that are interconnected and self-powered when needed. The difficulty lies in the global and local management of each site's power. Indeed, it is imperative to consider each site's constraints and ensure communication between them. The interconnection of the sites allows the exchange of energy to minimize the overall cost of purchasing electricity from the national grid. To meet the above objectives, we have proposed global and generic energy management based on nonlinear programming. The proposed management can be applied for any number of sites (n sites) while ensuring local and global management. The simulation results show that the proposed strategy meets the established objectives.

3.4.3 Development of a Power Hardware-In-The-Loop (PHIL) test bench to emulate a microgrid

- Master Thesis included in this topic: A. IALLI (02/2022-07/2022).

In this work, we have developed a PHIL test bench that emulates a DC microgrid. This microgrid consists of various sources and loads, Boost converters, a dSPACE system (SCALEXIO LabBox), and a Lithium-ion battery (48V, 100Ah, LiFePO4 battery). It emulates a hybrid system that contains different renewable energy sources (wind, tidal, PV) connected with a lithium-ion battery storage systems. The current challenge is to combine this microgrid with a hydrogen storage system consisting of a fuel cell and an electrolyser. This module will be used to develop, optimize and validate energy management controllers.

4 Research Project

2017-2023: Participant and contributor to the Interreg North-West Europe project: Integrating Tidal energy into the European Grid **(ITEG)**. **Unicaen Budget: 612 K€**. Total Budget: 11.79 M€. Partnerships: Unicaen, European Marine Energy Centre, Orbital Marine Power, Energy Valley, Agence de Développement pour la Normandie, Université le Havre Normandie, Ghent University, Energy Systems Catapult, Elogen, Smart Hydrogen Consulting. ITEG aims to develop and validate an integrated tidal energy and hydrogen production solution for clean energy generation to be demonstrated in Orkney. The project addresses energy-related carbon emissions in North West Europe and will tackle grid export limitations faced in remote communities. Within ITEG project, LUSAC will bring its expertise in marine energy and will develop an advanced energy management system for tidal generators in grid operating mode. The main issue tackled is the energy quality and quantity by optimizing the system efficiency based on control algorithms. The system with and without energy storage will be modelled, simulated and optimized. The aim is to establish a generic software integrating technic and economic models.

2024-2027: Participant and contributor to the "Important Project of Common European Interest for Next Generation Cloud Infrastructure and Services" (IPCEI-CIS).**Unicaen Budget: 217 K€**. Partnerships: Unicaen, Orange Innovation. In the IPCEI-CIS, Unicaen aims to develop noval energy management algorithms for microgrid of telecomunication station. The challenge is to propose robust optimization algorithms that meet the load demand and satisfy the constraints of telecomnucation systems. Moreover, the optimization of the energy management in the sense of minimising the cost does not imply the optimal profil for the energy storage systems. In this project, the aging of the energy storage systems will be explicity integrated in the overall energy management algorithms.

5 Supervision of PhD and Master thesis

5.1 PhD student (finished)

1- Yue Zhou. 01/04/2018-15/12/2021. Subject: Higher-Order Sliding Mode Control Approaches for Hybrid Power System Integrating Degradation of the Main Source. **Associated scientific production** (see Publications section): Peer-reviewed Journals [6 J, 7 J]. Conferences [9 c, 16 c].

2- Yassine Tougzahoui. 12/02/2021-15/10/2023. **Subject:** Energy management optimization of a microgrid by Artificial Intelligence (AI). **Associated scientific production** (see Publications section): Conferences [20 c].

5.2 PhD students in Progress

3- Sharafadeen Muhammad. since 01/02/2024. **Subject:** Development of Reinforcement Learning Algorithms for Voltage Control in DC Microgrids.

4- Othmane Hamzaoui. since 1/11/2022. **Subject:** Modeling, Optimization and Energy Management of network sites using AI. **Associated scientific production** (see Publications section): Conferences [14 c].

5.3 Master thesis (finished)

1- Othmane Hamzaoui. 1/02/2021-10/06/2021. **Subject:** Energy management optimization for hybrid power system of 5G telecom station.

2- Ahmad Eid El Iali. 10/03/2022-15/07/2022. **Subject:** Development of a Power Hardware-In-The-Loop (PHIL) test bench to emulate a DC microgrid.

3- Yusif Imamverdiyev. 01/02/2023-01/06/2023. **Subject:** Prognostic of Fuel Cells by artificial neural networks.

6 Participation in thesis committee (excluding jointly supervised students).

- **Léo Grill. Subject :** Optimisation of Energy Consumption of Data Center using Artificial Intelligence. **Defended** on June 23, 2023 at University of Poitiers, France.

A Publications

A.1 Journal Articles

[**1 J**] Y. Chitour, **H. Obeid**, S. Laghrouche, L. Fridman, *Barrier function-based adaptive continuous higher-order sliding mode controllers*, Nonlinear Analysis: Hybrid Systems, 2025.

[**2 J**] L. Ovalle, A. Gonzalez, L. Fridman, S. Laghrouche, **H. Obeid**, *Analysis of barrier function based adaptive sliding mode control in the presence of deterministic noise*, Automatica 171, pp. 111946, 2025.

[**3 J**] A Badji, **H. Obeid**, M. Hilairet, S. Laghrouche, DO. Abdeslam, A. Djerdir, *Enhanced energy management of fuel cell electric vehicles using integral sliding mode control and passivity-based control*, Applied Energy 377, pp. 124653, 2025.

[**4 J**] C. D. Cruz-Ancona, L. Fridman, **H. Obeid**, S. Laghrouche, C. A. Pérez-Pinacho, *A uniform reaching phase strategy in adaptive sliding mode control*, Automatica, 2023.

[**5 J**] **H. Obeid**, R. Petrone, H. Gualous, H. Chaoui, *Higher Order Sliding-Mode Observers for State-of-Charge and State-of-Health estimation of Lithium-ion batteries*, IEEE transactions on Vehicular Technology, 2022.

[**6 J**] **H. Obeid**, S. Laghrouche, L. Fridman *Dual layer barrier functions based adaptive higher order sliding mode control*, International journal of robust and nonlinear control, vol. 31, pp. 3795-3808, 2021.

[**7 J**] Y. Zhou, **H. Obeid**, S. Laghrouche, M. Hilairet, A. Djerdir, *A novel second-order sliding mode control of hybrid fuel cell/super capacitors power system considering the degradation of the fuel cell*, Energy Conversion and Management, vol. 229, pp. 113766, 2021.

[**8 J**] S. Laghrouche, M. Harmouche, Y. Chitour, **H. Obeid**, L. Fridman, *Barrier function-based adaptive higher order sliding mode controllers*, Automatica, vol. 123, pp. 109355, 2021.

[**9 J**] Y. Zhou, **H. Obeid**, S. Laghrouche, M. Hilairet, A. Djerdir, *A Disturbance Rejection Control Strategy of a Single Converter Hybrid Electrical System Integrating Battery Degradation*, Energies, vol. 13, pp. 2781, 2020.

[**10 J**] **H. Obeid**, S. Laghrouche, L. Fridman, Y. Chitour, M. Harmouche, *Barrier function-Based Adaptive Super-Twisting Controller*, IEEE Transactions on Automatic Control, vol. 65, no. 11, pp. 4928-4933, 2020.

[**11 J**] L. Zhang, **H. Obeid**, S. Laghrouche, M. Cirrincione, *Second Order Sliding Mode Observer of Linear Induction Motor*, IET Electric Power Application, vol. 13, no. 1, pp. 38-47, 2019.

[**12 J**] L. Zhang, H. Zhang, **H. Obeid**, S. Laghrouche, *Time-varying State Observer Based Twisting Control of Linear Induction Motor Considering Dynamic End Effects with Unknown Load Torque*, ISA Transactions, vol. 93, pp. 290-301, 2019.

[**13 J**] **H. Obeid**, L. Fridman, S. Laghrouche, M. Harmouche, M. Ali Golkani, *Adaptation of Levant's Differentiator Based on Barrier Function*, International journal of control, vol. 91, no. 9, pp. 2019-2027, 2018.

[**14 J**] **H. Obeid**, L. Fridman, S. Laghrouche, M. Harmouche, *Barrier Function-Based Adaptive Sliding Mode Control*, Automatica, vol. 93, pp. 540-544, 2018.

A.2 Conference and Workshop Papers

[1 c] F. Didier, **H. Obeid**, Y. Chitour, L. Fridman, S. Laghrouche, *Adaptive Neural Network-Based Higher-Order Sliding Mode Control for Floating Offshore Wind Turbines*, 17^{th} International Workshop on Variable Structure Systems (VSS2024), Abu Dhabi, UAE, 2024.

[2 c] O. Hamzaoui, B. Francoise, **H. Obeid**, S. Le Masson, H. Gualous. *Neural Network-Driven Optimization for Cost Minimization in Telecom Energy Systems with Nonlinear Converter Efficiencies*, International Conference on Intelligent Systems and Computer Vision (ISCV2024), Fez, Morocco, 2024.

[3 c] H. Elaouni, **H. Obeid**, S. Le Masson, O. Foucault, H. Gualous, *Performance of Linear Programming in optimizing the energy schedule of a grid-connected hybrid system compared to Particle Swarm Optimization*, 12^{th} International Conference on Smart Grids, Green Communications and IT Energy-aware Technologies, ENERGY 2022, Venice, Italy, 2022.

[4 c] **H. Obeid**, S. Laghrouche, M. Hilairet, Y. Zhou, *Integral sliding mode control combined with Passivity-based control applied to Fuel Cell/ Supercapacitors hybrid power system of Electric Vehicles*, Vehicle Power and Propulsion Conference (VPPC), Merced, California USA, 2022.

[5 c] H. Basbas, **H. Obeid**, S. Laghrouche, M. Hilairet, F. Plestan, *Comparative study of three high order sliding mode model based design for a floating wind turbine robust control*, 61^{th} IEEE Conference on Decision and Control (CDC 2022), Cancún, Mexico, 2022.

[6 c] H. Basbas, **H. Obeid**, S. Laghrouche, M. Hilairet, F. Plestan, *Model-Based Super-Twisting Controller for a Tensioned-Leg-Platform Floating Offshore Wind Turbine*, 48^{th} Annual Conference of the IEEE Industrial Electronics Society (IECON 2022), Brussels, Belgium, 2022.

[7 c] H. Basbas, **H. Obeid**, S. Laghrouche, M. Hilairet, F. Plestan, *Barrier Function Based-Adaptive Super-Twisting Algorithm for Floating Offshore Wind Turbine*, 16^{th} International Workshop on Variable Structure Systems (VSS22), Rio de Janeiro, Brazil, 2022.

[8 c] Y. Toughzaoui, **H. Obeid**, R. Petrone, H. Louahlia, H. Gualous, *System Sizing and Energy Management Optimization using a Hybrid Model* , 10^{th} International Conference on Systems and Control (ICSC 2022), Marseille, France, 2022.

[9 c] A. Alex, R. Petrone, **H. Obeid**, B. Tala-Ighil, L. Vandevelde, H. Gualous, *Electrolytic hydrogen production from tidal energy: A technical and economic perspective*, Proceedings of the 14^{th} European Wave and Tidal Energy Conference (EWTEC), Plymouth, UK, 2021.

[10 c] H. Elaouni, **H. Obeid**, S. Le Masson, O. Foucault, H. Gualous, *A comparative study for optimal sizing of a grid-connected hybrid system using Genetic Algorithm, Particle Swarm Optimization, and HOMER*, 47^{th} Annual Conference of the IEEE Industrial Electronics Society (IECON 2021), Toronto, Canada, 2021.

[11 c] **H. Obeid**, O. Hamzaoui, R. Petrone, S. Le Masson, H. Gualous, *A Fuzzy logic-based energy management approach for hybrid system of 5G telecom station*, 9^{th} International Conference on Systems and Control (ICSC 2021), Caen, France, 2021.

[12 c] C. D. Cruz-Ancona, M. A. Estrada, L. Fridman, **H. Obeid**, S. Laghrouche, *Adaptive Continuous Controllers Ensuring Prescribed Ultimate Bound for Uncertain Dynamical Systems*, IFAC-PapersOnLine, Berlin, Germany, 2020.

[13 c] Y. Zhou, **H. Obeid**, S. Laghrouche, M. Hilairet, A. Djerdir,*Disturbance Rejection Control Strategy of Hybrid Battery/Super Capacitors Power System Based on a Single Converter*, 8^{th} International Conference on Renewable Energy Research and Applications (ICRERA), Romania, 2019.

[**14 c**] **H. Obeid**, S. Laghrouche, L. Fridman, *A Barrier Function Based-Adaptive Super-Twisting Controller for Wind Energy Conversion System*, 58^{th} IEEE Conference on Decision and Control (CDC 2019), Nice, France, 2019.

[**15 c**] L. Zhang, **H. Obeid**, S. Laghrouche, *Adaptive Super Twisting Control of Linear Induction Motor Considering Dynamic End Effects*, IEEE International Conference on Industrial Technology (ICIT), Lyon, France, 2018.

[**16 c**] L. Zhang, **H. Obeid**, S. Laghrouche, *Adaptive Twisting Controller for Linear Induction Motor Considering Dynamic End Effects*, 15^{th} International Workshop on Variable Structure Systems and Sliding Mode Control (VSS18), Graz Universitiy of Technology, Austria, 2018.

[**17 c**] L. Zhang, **H. Obeid**, S. Laghrouche, Mustapha Hamerlain, *Adaptive High Order Sliding Mode Observer of Linear Induction Motor*, 15^{th} International Workshop on Variable Structure Systems and Sliding Mode Control (VSS18), Graz Universitiy of Technology, Austria, 2018.

[**18 c**] L. Zhang, **H. Obeid**, S. Laghrouche, Mustapha Hamerlain, *Nonlinear Feedback Super Twisting Field Oriented Control of Linear Induction Motors Considering Dynamic End Effects*, 15^{th} International Workshop on Variable Structure Systems and Sliding Mode Control (VSS18), Graz Universitiy of Technology, Austria, 2018.

[**19 c**] **H. Obeid**, L. Fridman, S. Laghrouche, M. Harmouche, *Barrier Function-Based Adaptive Twisting Controller*, 15^{th} International Workshop on Variable Structure Systems and Sliding Mode Control (VSS18), Graz Universitiy of Technology, Austria, 2018.

[**20 c**] **H. Obeid**, L. Fridman, Salah Laghrouche, M. Harmouche, *Barrier Function-Based Adaptive Integral Sliding Mode Control*, 57^{th} IEEE Conference on Decision and Control (CDC 2018), Fontainebleau, Miami Beach, USA, 2018.

[**21 c**] **H. Obeid**, L. Fridman, S. Laghrouche, M. Harmouche, *Barrier Adaptive First Order Sliding Mode Differentiator*, IFAC World Congress, Toulouse, France, 2017.