

# Annual Conference of the IEEE Industrial Electronics Society (IECON 2021)

## Special Session on

### “Model Predictive Control for Power Converters”

#### Organized by

Principal Organizer: Fadia SEBAALY ([fadia\\_sebaaly@hotmail.com](mailto:fadia_sebaaly@hotmail.com))

Affiliation: Ecole de Technologie Supérieure, Montréal, Canada

Background: Control of multilevel converters, sliding-mode control, model predictive control, grid-connected converters

Organizer 2: Jose Rodriguez ([jose.rodriguez@unab.cl](mailto:jose.rodriguez@unab.cl))

Affiliation: Universidad Andres Bello, Santiago, Chile

Background: Power electronics, multilevel converters, predictive control, renewable energy, industrial electronics

Organizer 3: Hadi Y. KANAAN ([hadi.kanaan@usj.edu.lb](mailto:hadi.kanaan@usj.edu.lb))

Affiliation: Saint-Joseph University of Beirut, Faculty of Engineering – ESIB, Lebanon

Background: Modelling and control of switch-mode converters, power quality, grid-connected inverters for renewable sources

Organizer 4: Kamal AL-HADDAD ([kamal.al-haddad@etsmtl.ca](mailto:kamal.al-haddad@etsmtl.ca))

Affiliation: Ecole de Technologie Supérieure, Montréal, Canada

Background: Power Electronics, Energy Conversion

Organizer 5: Mokhtar Aly ([mokhtar.aly@aswu.edu.eg](mailto:mokhtar.aly@aswu.edu.eg))

Affiliation: Aswan University, Aswan, Egypt

Background: Multilevel inverters, fault tolerant control, model predictive control, multi-input power converters, renewable energy applications, and grid-connected inverters

## Call for Papers

Recently, Model Predictive Control (MPC) methods have gained considerable attention due to their straightforward design, simple inclusion of different objectives and their discrete nature that is natural for control of power converters. Therefore, it has been designed for a lot of different converter topologies targeting wide range of applications. The basic idea behind this technique is using the system's mathematical model to predict its future behavior according to the different switching states. By solving an optimization problem that includes the control objectives, the predicted variables, and possible constraints of the system, the control actions are applied. However, MPC's design and implementation can impose some limitations due to the high computational burden and/or variable switching frequency operation and/or weighting factors design. Improvements of MPC algorithms and their combination with

intelligent controllers were proposed. Therefore, this special session concentrates on the latest advancements of model predictive control algorithms design.

Topics of interest include, but are not limited to:

- Latest development and improvements of predictive control algorithms.
- Recent model predictive control solutions for weighting factor elimination.
- New model predictive control methods for switching frequency reduction and control, and computation burdens reduction.
- Model-Free predictive control solutions for power converters in grid connected and motor drive applications.
- Model predictive control designs for power converters: multilevel converters, matrix converters, DC-DC, DC/AC and AC/DC etc.
- Model predictive control algorithms for grid connectivity applications: grid-tied converters, active front end rectifiers etc...
- Model predictive control methods for power quality application: active filters, STATCOM, etc...
- Model predictive control for drives applications: induction motors, PMSM machines, etc...
- Hybrid control with model predictive technique: MPC with artificial neural network ANN, MPC- fuzzy logic, MPC-sliding mode, etc...
- Machine learning with model predictive control

**Submissions Procedure:** All the instructions for paper submission are included in the conference website: <https://attend.ieee.org/iecon-2021/>

### **Deadlines:**

|                                |               |
|--------------------------------|---------------|
| Full paper submission:         | June 25, 2021 |
| Paper acceptance notification: | July 30, 2021 |
| Camera-ready paper submission: | Aug. 27, 2021 |

### **Sponsoring IES Technical Committees**

Technical Committee on Power Electronics (TCPE)  
Subcommittee on Control in Power Electronics