



## ICIT 2021 Special Session

### **“Advanced Topologies and Control Techniques for Multilevel Converters”**

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**Mohammad Sharifzadeh** was born in Sari, Iran in 1989. He received the B.Sc. and M.Sc. degrees in power electrical engineering from Babol Noshirvani University of Technology (NIT), Babol, Iran in 2012, and 2015, respectively. He is currently pursuing his PhD in power electrical engineering at the École de Technologie Supérieure (ÉTS), University of Quebec, in Montreal, Canada, as a member of Groupe de Recherche en Électronique de Puissance et Commande Industrielle (GRÉPCI). His research interests include power electronics multilevel converters; topologies, switching techniques particularly Selective Harmonic Elimination/Mitigation techniques and advanced control of multilevel voltage source inverters in grid connected applications as well as optimization methods applications in power system.



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**Mohammad Babaie** was born in Dorud, Iran, on January 14, 1992. He received the B.Sc. degree in electronic engineering from Sepahan Science and Technology Higher Education Institute, Isfahan, Iran in 2013 and the M.Sc. degree in control engineering from Babol Noshirvani University of Technology (NIT), Babol, Iran in 2016. Since 2019, he has been working toward the Ph.D.



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control techniques, applications of the classical and meta-heuristic optimization algorithms in the control theory and the power systems, developing ANN training strategies with application in the power systems, and real-time control based on the FPGA and 32-bit MCUs for power electronic converters.

#### **-Technical Outline of the Session and Topics:**

Multilevel converters including DC/AC and AC/DC are nowadays used in various industrial, commercial, and domestic applications such as grid-connected systems, rectifiers, active power filter, UPS, electrical drives, etc. This converter makes use of abundant number of power semiconductor devices that should be properly controlled to have maximum efficiency. The primary challenge is to find appropriate topology, design the suitable PWM switching techniques, and apply the appropriate controller. Moreover, since the multilevel converters have nonlinear character, closed loop based system using advanced controllers such as sliding mode, model predictive, adaptive, intelligent methods to meet the targeted application. Therefore, this special session concentrates on the latest development of multilevel converters topologies, control and device switching techniques but not limited to.

- PWM modulation technique for multilevel inverters
- Innovative and intelligent closed loop control strategies
- Novel current based control design for renewable energy generation using grid-connected converters
- Recent development techniques for common mode voltage control and drives application

Industrial applications in the area of power quality, electrification and transportation, UPS, etc.

#### **-IEEE IES Technical Committee Sponsoring the Special Session:**

TCPE (Control in Power Electronics subcommittee)