



EPEC 2018

Clean Technologies for Smart Cities
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Paper presentation sessions

Paper session 1: Photovoltaic energy systems I

Session chair: Olivier Trescases, University of Toronto

- PV01:** A Power Mismatch Elimination Strategy for an MMC-based PV System in Unbalanced Grids, Hasan Bayat (Western University, Canada); Amirnaser Yazdani (Ryerson University, Canada).
- PV02:** A Novel Algorithm for Performance Improvement of Solar Photovoltaics Under Partial Shading Conditions, Maliduwa Liyana Arachchige Lakna Harindie Liyanarachchi and Maliduwa Liyana Arachchige Harin Laksitha Liyanarachchi (Curtin University, Australia); Sunil Gamini Abeyratne (University of Peradeniya, Sri Lanka).
- PV03:** Current-Based Protection Scheme for Faults Within Utility-Scale Photovoltaic Arrays, Khaled Saleh (CanmetENERGY - Varennes & Natural Resources Canada, Canada); Ehab El-Saadany (Waterloo University, Canada); Hatem Zeineldin (Masdar Institute of Science and Technology, United Arab Emirates).
- PV04:** Maximum Likelihood Parameters Estimation of Single-Diode Photovoltaic Module/Array: A Comparative Study at STC, Albert Ayang (University of Quebec in Chicoutimi; University of Quebec in Abitibi-Témiscamingue, Canada); Wamkeue Rene (University of Quebec in Abitibi-Témiscamingue, Canada); Mohand Ouhrouche (University of Quebec at Chicoutimi, Canada); Malwe Boudoue Hubert (University of Maroua, Cameroon).
- PV05:** Faults Diagnosis and Monitoring of a Single Diode Photovoltaic Module Based on Estimated Parameters, Albert Ayang (University of Quebec in Chicoutimi, University of Quebec in Abitibi-Témiscamingue, Canada); Wamkeue Rene (University of Quebec in Abitibi-Témiscamingue, Canada); Mohand Ouhrouche (University of Quebec at Chicoutimi, Canada); Mohamad Saad (Université du Québec en Abitibi-Témiscamingue, Canada).

Paper session 2: Smart grids & smart cities

Session chair: Hany Farag, York University

- SG01:** Possible Approaches to Trade Non-Electric Energy Sources in the Next Generation Smart Grids, Ali R. Al-Roomi (Dalhousie University, College of Engineering, Canada); Mohamed E. El-Hawary (Dalhousie University, Canada).
- SG02:** Real-Time Dynamic Voltage Stability Assessment Through a Wide-Area Loss Index, Mahyar Zarghami (California State University, Sacramento, USA).
- SG03:** Cloud Computing Energy Efficiency and Fair Pricing Mechanisms for Smart Cities, Seyed Mohammad Reza Dibaj (Ryerson University, Canada); Leila Sharifi (Instituto Superior Técnico; Urmia University, Portugal); Ali Miri (Ryerson University & University of Ottawa, Canada); Jing Zhou (Centennial College, Canada); Azadeh Aram (Ryerson University, Canada).
- SG04:** Fuzzy AHP-based Siting of Small Modular Reactors for Power Generation in the Smart Grid, Reena Shrestha, Doug Wagner and Irfan S. Al-Anbagi (University of Regina, Canada).
- SG05:** Microgrid Feasibility Study for Future Smart Communities: A Case Study for London, Ontario, Elham Akhavan (S2e, Canada); Gary Stevens (S2e Technologies, Canada); Ehab El-Saadany (Waterloo University, Canada).

Paper session 3: Electric machines

Session chair: Vijay K. Sood, University of Ontario Institute of Technology

EM01: Design and Implementation of a High-Temperature Superconductive Radial-Flux Permanent-magnet Motor and Comparison Study, Shahrzad Karami (West Tehran Branch Azad University, Iran); Alireza Siadatan (University of Toronto, Canada); Arsalan Hekmati (Sharif University of Technology, Iran).

EM02: Energy-Efficient Motion Planning for Electrical Drives, Sara Hosseini (Friedrich-Alexander-University of Erlangen-Nuremberg, Germany); Ingo Hahn (FAU Erlangen, Germany).

EM03: Geometric Optimization of Switched Reluctance Motors Using an Invasive Weed Method, Ehab Sayed, Mohamed Bakr, Berker Bilgin and Ali Emadi (McMaster University, Canada).

EM04: A MATLAB Toolbox for Adjoint-Based Sensitivity Analysis of Switched Reluctance Motors, Ehab Sayed, Mohamed Bakr, Berker Bilgin and Ali Emadi (McMaster University, Canada).

EM05: Design of a Switched Reluctance Motor for a Pump Jack Application, Ehab Sayed, Peter Azer, Milan Kordic, John Reimers, Berker Bilgin and Mohamed Bakr (McMaster University, Canada); Ali Emadi (Illinois Institute of Technology, USA).

EM06: Real-Time Implementation of Asynchronous Machine Using LabVIEW RTX and FPGA Module, Ali Parizad (Southern Illinois University Carbondale, USA); Mohamad Esmail Iranian (MAPNA - MECO, Iran); Amirnaser Yazdani (Ryerson University, Canada); Hamid Reza Baghaee and Gevork B. Gharehpetian (Amirkabir University of Technology, Iran).

Paper session 4: Photovoltaic energy systems II

Session chair: Zhe Gong, University of Toronto

PV06: Solar Forecasting for Power System Operator, Irene Wanady and Aparna Viswanath (University of Newcastle, Singapore); Kaushik Mahata (University of Newcastle).

PV07: A Novel MPPT Method Based on Cuckoo Search Algorithm and Golden Section Search Algorithm for Partially Shaded PV System, Kuo Lung Lian (National Taiwan University of Science and Technology, Taiwan).

PV08: Impact of Integrating Electric Vehicles and Rooftop Solar Photovoltaic on Transformer's Aging Considering the Effect of Ambient Temperature, Shady El-Battawy, Bishoy Basta and Walid Morsi (University of Ontario Institute of Technology, Canada).

PV09: Directional Solar Variability Analysis, Alexandre Gagne, Nayeem Ninad and John Adeyemo (Renewable Energy Integration, CanmetENERGY, Natural Resources Canada, Canada); Dave Turcotte (CanmetENERGY, Natural Resources Canada, Canada); Steven Wong (Natural Resources Canada, Canada).

PV10: IoT-based MPPT Controller for Photovoltaic Array, Michael Bardwell, Jason Wong, Shida Zhang and Petr Musilek (University of Alberta, Canada).

Paper session 5: Policies, regulation, and planning

Session chair: Jessie Ma, Ryerson University

PP01: Managing Disaster Mutual Assistance Operations in Electricity Companies, Ali Asgary (York University, Canada); Ben Pantin (Toronto Hydro-Electric System Limited, Canada); Arun Selvadurai (York University, Canada).

PP02: Capacity Premium Model to Assure Social Optimal Transmission Expansion in a Profit Driven Framework, Harivina Gunnaasankaraan (University of Newcastle, Australia); Aparna Viswanath (University of Newcastle, Singapore).

PP03: Utility Blockchain for Transparent Disaster Recovery, Mehmet Demir, Atefeh (Atty) Mashatan, Ozgur Turetken and Alexander Ferworn (Ryerson University, Canada).

PP04: Increasing Renewable Energy Penetration Through Strategic Deployment of IoT Devices, Terri Chu (MOAI Solutions Inc, Canada); S Chen (York University, Canada); Alejandro Mayoral-Banos (Indigenous Friends Association, Canada); Riad Hartani (Xona Partners, Canada).

PP05: Layout Planning of Renewable Energy in Consideration of Power Transmission Range Based on Transmission Capacity, Terumi Onishi and Shin'ya Obara (Kitami Institute of Technology, Japan); Masaki Okada (National Institute of Technology Asahikawa College, Japan); Yuji Ito (Hokkaido Electric Power Company, Japan).

Paper session 6: Power systems planning and operation I

Session chair: Hany Farag, York University

PS01: Hybrid Harmonic Estimation Based on Least Square Method and Bacterial Optimization, Abolfazl Rahimnejad and Ibrahim Al-Omari (University of Guelph, Canada); Reza Barzegaran (Lamar University, USA); Hadis Karimipour (University of Guelph, Canada).

PS02: A Fuzzy Probabilistic Power Flow Method Based on Fuzzy Copula Model, Chaofan Lin (Xi'an Jiaotong University, P.R. China); Yonglin Chen (Toronto Central Academy, Canada); Zhaohong Bie (Xi'an Jiaotong University, P.R. China).

PS03: Resilient Power Sharing Through Adaptive Configurations of Coordinated VSGs, Aazim Rasool, I (North China Electric Power University, Beijing, Goldwind Science and Technology, Co. Ltd, Beijing, P.R. China); XiangWu Yan (North China Electric Power University, P.R. China); Haaris Rasool (National University of Computer and Emerging Science FAST Islamabad, Pakistan); HongXia Guo (Goldwind Science and Technology, Co. Ltd., Beijing, P.R. China).

PS04: Routine for Simulating Transmission Lines with Symmetrical and Asymmetrical Configurations Using a Real and Constant Modal Transformation Matrix, Pablo Torrez Caballero (Sao Paulo State University, Brazil); Sérgio Kurokawa (UNESP, Brazil); Behzad Kordi (University of Manitoba, Canada).

PS05: Effect of Unsteady Surface Wave on the Performance of Tidal In-Stream Power Systems, Ali Fituri, Hamed Aly and Mohamed E. El-Hawary (Dalhousie University, Canada).

PS06: Frequency Enhancement Through a Unified Smart Generation System, Mahyar Zarghami (California State University, Sacramento, USA).

Paper session 7: Electric vehicles

Session chair: Zhe Gong, University of Toronto

EV01: Influence of the Magnetic Bridges on the Flux Focusing Type Axial Flux Permanent Magnet Motor, Qurban Ali Shah Syed (University of Erlangen-Nuremberg, Germany); Ingo Hahn (FAU Erlangen, Germany).

EV02: Modeling and Simulation of an Autonomous-capable Electrified Vehicle: A Review, Richard Hamilton, Hayden Seager, Kavya Prabha Divakarla, Ali Emadi and Saiedeh Razavi (McMaster University, Canada).

EV03: Pricing of Flexibility Provisions from a Reinforced Electric Vehicle Charging Facility with DERs, Walied Alharbi and Kankar Bhattacharya (University of Waterloo, Canada) Electric Vehicles.

EV04: Scheduling of Merchant Owned EV Charging at a Charging Facility with Multiple Chargers, Isuru Vidanalage, Carlos Sabillon and Bala Venkatesh (Ryerson University, Canada); Ricardo Torquato (University of Campinas, Brazil); Walmir Freitas (UNICAMP, Brazil).

EV05: A Novel Transactive Energy Framework for Prosumers with Battery Storage and Electric Vehicles, Matt Gray and Walid Morsi (University of Ontario Institute of Technology, Canada).

Paper session 8: Electricity market, conservation & demand management

Session chair: Hadis Karimipour, University of Guelph

MC01: Deep Neural Networks (DNN) for Day-Ahead Electricity Price Markets, Radhakrishnan Angamuthu Chinnathambi, Siby Plathottam, Tareq Hossen, Arun Sukumaran Nair and Prakash Ranganathan (University of North Dakota, USA).

MC02: Investigation of Price-Feature Selection Algorithms for the Day-Ahead Electricity Markets, Radhakrishnan Angamuthu Chinnathambi, Mitch Campion, Arun Sukumaran Nair and Prakash Ranganathan (University of North Dakota, USA).

MC03: How to Improve Linear Fuel-Cost Function to Compete with Quadratic and Cubic Functions, Ali R. Al-Roomi (Dalhousie University, College of Engineering, Canada); Mohamed E. El-Hawary (Dalhousie University, Canada).

MC04: Cooperative Scheme for Efficient Communication Using Renewable-Powered Base Stations, Mahdi Ben Ghorbel (University of British Columbia, Okanagan, Canada); Md. Jahangir Hossain (University of British Columbia, Okanagan, Canada); Sabbir U. Ahmad (Primary Engineering, Construction Corp, Canada).

MC05: Demand Control of Baseboard Heaters: Lessons Learned from 50-Home Pilot Study, Ajit Pardasani, Jennifer A. Veitch, Guy Newsham and Yitian Hu (National Research Council Canada, Canada); Terrance Cormier and Sonya Hull (Siemens Canada, Canada).

MC06: Development of a Gas Hydrate Power Generation System for Cold District Using Low Temperature Heat Emission, Yuta Uemura (Kitami Institute of Technology, Japan); Shin'ya Obara (Kitami Institute of Technology, Japan); Toshiyuki Kawasaki (Kitami Institute of Technology, Japan).

Paper session 9: Power systems planning and operation II

Session chair: Hany Farag, York University

PS07: Fault Detection and Location in Power Transmission Line Using Concurrent Neuro Fuzzy Technique, Patrick Serge Pouabe Ebooue and Jan Harm Pretorius (University of Johannesburg, South Africa); Nhlanhla Mbuli (University of Johannesburg & Eskom Holdings SoC Limited, South Africa); Collins Leke (University of Johannesburg, South Africa).

PS08: Bus-Angle Difference Structural Cuts for Transmission System Expansion Planning with L-1 Reliability, Laura M. Escobar (Unesp - Universidad Estadual Paulista Julio de Mesquita Filho, Brazil); Adolfo Escobedo (Arizona State University, USA); David Escobar (Montreal University, Canada); Rubén Romero (Unesp - Universidad Estadual Paulista Julio de Mesquita Filho, Brazil).

PS09: Simultaneous Voltage Regulation and Power Sharing Control Algorithm for MTDC Grids, Aram Kirakosyan (University of Waterloo, Canada); Ehab El-Saadany (Waterloo University, Canada); Mohamed El-Moursi (Masdar Institute, United Arab Emirates).

PS10: Emulating Subsynchronous Resonance Using Hardware and Software Implementation, Roozbeh Sadeghi and Andrew M Knight (University of Calgary, Canada).

PS11: Estimation of Parameters for Faulted Transposed Transmission Lines, Julia Rivera Pineda (São Paulo State University, Brazil); Sérgio Kurokawa (UNESP, Brazil).

Paper session 10: Industry papers session

Session chair: Murray MacDonald

IP01: Resilient Solutions for High Short Circuit Current, New Safety Solutions for Arc Flash, Sever Bodea (IEEE93003722, ABB Inc, Canada).

IP02: Challenges in Assuring Security and Resilience of Advanced Metering Infrastructure, Jason Jaskolka (Carleton University, Canada).

IP03: Sub-Harmonic Protection Application for Interconnections of Series Compensated Lines and Wind Farms, Rene Midence (ERLPhase Power Technologies, Canada).

IP04: Commissioning Process and Acceptance Test of a Sub-Harmonic Protection Relay, Rene Midence (ERLPhase Power Technologies, Canada).

Paper session 11: Wind energy systems

Session chair: Omid Alizadeh

WE01: Dynamic Average Modeling of a CSI-based Small-Scale Stand-alone Wind Energy Conversion System, Zuher Alnasir (Jubail Industrial College, Saudi Arabia); Mehrdad Kazerani (University of Waterloo, Canada).

WE02: Evaluation of Parametric Statistical Models for Wind Speed Probability Density Estimation, Maisam Wahbah (Khalifa University, United Arab Emirates); Omar Alhussein (University of Waterloo, Canada); Tarek El Fouly, Bashar Zahawi and Sami Muhaidat (Khalifa University, United Arab Emirates).

WE03: Measurement-Based Characteristic Curves at Point of Interconnection of Wind Farms, Xiaodong Liang and Xiaodi Yan (Memorial University of Newfoundland, Canada); Nahidul Khan (Newfoundland and Labrador Hydro, Canada).

WE04: Effect of Wind Generation Uncertainty on Voltage Stability - A Singular Value Analysis, Aline Petean-Pina (UNESP - Ilha Solteira, Canada); Chandrabhanu Opathella and Bala Venkatesh (Ryerson University, Canada).

Paper session 12: Data analytics & computation methods

Session chair: Hany Farag, York University

DA01: A Very Deep One Dimensional Convolutional Neural Network (VDOCNN) for Appliance Power Signature Classification, Prajna Dash and Kshirasagar Naik (University of Waterloo, Canada).

DA02: On the Necessity of Exogenous Variables for Load, PV and Wind Day-Ahead Forecasts Using Recurrent Neural Networks, Henning Wilms (Automation of Complex Power Systems, RWTH Aachen University, Germany); Marco Cupelli (EON Energy Research Center - RWTH Aachen University, Institute for Automation of Complex Power Systems, Germany); Antonello Monti (RWTH Aachen University, Institute for Automation of Complex Power Systems, Germany).

DA03: Data Mining Model for Evaluating and Forecasting Energy Consumption by Cloud Computing, Pedram Memari (University of Tehran, Iran); Seyedeh Samira Mohammadi (Islamic Azad University South Tehran Branch, Iran); Seyed Farid Ghaderi (University of Tehran, Iran).

Paper session 13: Energy storage systems

Session chair: Vijay K. Sood, University of Ontario Institute of Technology

ES01: Energy Storage Sizing and Siting in Microgrids, Chandrabhanu Opathella and Bala Venkatesh (Ryerson University, Canada).

ES02: Nonlinear Observer Design for RC Battery Model for Estimating State of Charge & State of Health Based on State-Dependent Riccati Equation, Reza Babazadeh (1650 boul De Maisonneuve, Concordia University, Canada); Ataollah Gogani Khiabani (Southern Methodist University, USA).

ES03: Operative Factors Affecting Energy Balancing and Speed of Equalization in Battery Storage System, Omid Palizban and Kimmo Kauhaniemi (University of Vaasa, Finland).

ES04: A Goal Programming Approach to Sizing and Timing of Third Party Investments in Storage System for Microgrids, Hisham Alharbi and Kankar Bhattacharya (University of Waterloo, Canada).

ES05: Development of an Optimum Operation Algorithm for Smart House with Storage Battery Control Based on Demonstration Tests, Takuma Hirasawa and Shin'ya Obara (Kitami Institute of Technology, Japan); Katsunori Nagano and Tomoaki Murakami (Hokkaido University, Japan); Osamu Kawae and Aya Togashi (National Institute of Technology, Asahikawa College, Japan).

Paper session 14: Distribution systems

Session chair: Hadis Karimipour, University of Guelph

DS01: An Approach to Distribution Systems Dynamic Service Restoration Utilizing Load Curves, Atousa Yazdani (CSUS, USA).

DS02: Impact of DG on Voltage Unbalance in Canadian Benchmark Rural Distribution Networks, Anastasios Papachristou, Ahmed Awad and Dave Turcotte (CanmetENERGY, Natural Resources Canada, Canada); Steven Wong (Natural Resources Canada, Canada); Alexandre Prieur (CanmetENERGY, Natural Resources Canada, Canada).

DS03: Distribution Network Reconfiguration for Voltage Stability Enhancement via Feasibility-Preserving Evolutionary Optimization, Alberto Landeros, Slawomir Koziel and Mohamed F. Abdel-Fattah (Reykjavik University, Iceland); Guillermo Gutierrez-Alcaraz (Instituto Tecnológico de Morelia, Mexico).

DS04: Fault-Observability Enhancement in Distribution Networks Using Power Quality Monitors; Amir Ameli (University of Waterloo, Canada); Ehsan Davarinejad (Sharif University of Technology, Tehran), Ehab El-Saadany (Waterloo University, Canada).

DS05: Optimization Approaches to Distribution System State Estimation for Optimal Meter Placement, Sreedevi Kandenkavil and Kankar Bhattacharya (University of Waterloo, Canada).

DS06: Implementation and Testing of a Hybrid Protection Scheme for Active Distribution Network, Amila Pathirana, Athula Rajapakse and Adeyemi Charles Adewole (University of Manitoba, Canada).

Paper session 15: Modeling & Design

Session chair: Omid Alizadeh

MD01: Modeling of Ferroresonance Phenomena in MV Networks, Waldemar Rebizant and Krzysztof Solak (Wroclaw University of Science and Technology, Poland).

MD02: Calculation of Power Transformer Losses by Finite Element Method, Mahshid Shamei (Khatam University, Iran); Farzaneh Nabizadeh (Islamic Azad University, North Tehran Branch, Iran); Seyed Hosseian Mirimani (Shahid Beheshti University, Iran); Alireza Siadatan (University of Toronto, Canada); Saeed Mousavi (Tehran Province Electricity Distribution Company, Iran).

MD03: Design, Modeling and Simulation for Stand-Alone Electric Vehicle Parking Lots Fed by Photovoltaic Systems, Ameen Yazdavar (University of Waterloo, Canada); Maher Abdelkhalek (University of Windsor, Canada); Ehab El-Saadany (Waterloo University, Canada).

MD04: A Power Quality and Load Analysis of a Cryptocurrency Mine, Keaton A Wheeler (University of Saskatchewan; Primary Engineering and Construction, Canada); Anthony Bowers and Charlie Wong (Primary Engineering and Construction, Canada); Jonathan Palmer (Canada & Primary Engineering and Construction, Canada); Xue Wang (Primary Engineering and Construction, Canada).

MD05: Investigation of an Energy Efficient Pump Speed Control Algorithm for Controlling Sump Level, Josh Dubey and Keith Goossen (University of Delaware, USA).

Paper session 16: Power electronics I

Session chair: Vijay K. Sood, University of Ontario Institute of Technology

PE01: Stability Analysis of a Hybrid Modular Multilevel Voltage Source Converter, Charithri Nanayakkara Yapa (University of Manitoba, Canada).

PE02: Design of Frequency Modulated Fuzzy Controller for Switched Capacitor Converter, Ahmed Al-Qallaf and Kamal El-Sankary (Dalhousie University, Canada).

PE03: An Improved Model Predictive Controller for Five-Level Active-Neutral-Point-Clamped Converter, Mostafa Abarzadeh (Ecole de Technologie Supérieure (ÉTS), Université du Québec, Canada, and Sahand University of Technology, Iran); Kamal Al-Haddad (Ecole de technologie supérieure, Canada).

PE04: PWM Sensor-less Balancing Technique for the Fifteen-Level PUC Converter, Youssef Ounejjar (Ecole de Technologie Supérieure de Montréal, Canada & Université Moulay Ismail de Meknès, Morocco); Kamal Al-Haddad (Ecole de technologie supérieure, Canada); Mostafa Abarzadeh (Ecole de Technologie Supérieure (ÉTS), Université du Québec, Canada & Sahand University of Technology, Iran).

PE05: Optimal Power Flow in Multi-Terminal HVDC Systems, Khaled Alshammari (University of Waterloo, Canada); Hasan Alrajhi Alsiraji (University of Waterloo; Umm Alqura University, Canada); Ramadan A. El Shatshat (University of Waterloo, Canada).

Paper session 17: Microgrids I

Session chair: Hadis Karimipour, University of Guelph

MG01: A Utility Maximized Demand-Side Management for Autonomous Microgrid, Aisha Pasha (United Arab Emirates University, United Arab Emirates); Hebatallah Ibrahim (None, United Arab Emirates); Syed Rafay Hasan and Rabie Belkacemi (Tennessee Tech University, USA); Falah Awwad (UAE University, United Arab Emirates); Osman Hasan (National University of Sciences and Technology, Pakistan).

MG02: Damping Power Oscillations in the Inverter-Dominated Microgrid, Houman Lahiji, Jafar Mohammadi and Firouz Badrkhani Ajaei (Western University, Canada); Ryan Boudreau (Hydro One Inc., Canada).

MG03: Modeling Short Lines for Time-Domain Simulation of the DC Microgrid, Houman Lahiji and Firouz Badrkhani Ajaei (Western University, Canada); Gary Stevens (S2e Technologies, Canada).

MG04: On the Existence of Voltage Collapse in Islanded Microgrids, Abdelsalam Eajal and Ameen Yazdavar (University of Waterloo, Canada); Ehab El-Saadany (Waterloo University, Canada); Kumaraswamy Ponnambalam (University of Waterloo, Canada).

MG05: Low-cost and Secure Communication System for Remote Microgrids Using AES Cryptography on ESP32 with LoRa Module, Amjad Iqbal and Mohammad Tariq Iqbal (Memorial University of Newfoundland, Canada).

MG06: Under Voltage-Frequency Load Shedding in an Islanded Inverter-based Microgrid Using Power Factor-based P-V Curves, Soleiman Rahmani (York university); Afshin Rezaei-zare (York University, Canada).

Paper session 18: Reliability, resiliency & cyber security

Session chair: [Bob Singh](#)

RC01: Real Time Monitoring & Protection of Power Transformer to Enhance Smart Grid Reliability, Nilesh Chothani (ADIT, India); Dharmesh D Patel (SVNIT Surat, India); Khyati Mistry (Sardar Vallabhabhai National Institute of Technology, India); Maulik Raichura (A D Patel Institute of Technology, India).

RC02: Using CSA Z463 Standard to Build a Foundation for Electrical Risk Management (FFERM), Terence Branch (Association of Professional Engineers of Ontario, IEEE, Canada).

RC03: Two-fold Intelligent Approach for Successful FDI Attack on Power Systems State Estimation, Abdullah M Sawas and Hany Farag (York University, Canada).

RC04: A Particle Filter-Based Approach for the Detection of False Data Injection Attacks on Automatic Generation Control Systems, Mohsen Khalaf (University of Waterloo, Canada); Amr Youssef (Concordia University, Canada); Ehab El-Saadany (Waterloo University, Canada).

RC05: Detection of False Data Injection Attacks in Automatic Generation Control Systems Considering System Nonlinearities, Abdelrahman Ayad and Mohsen Khalaf (University of Waterloo, Canada); Ehab El-Saadany (Waterloo University, Canada).

RC06: Multivariate Mutual Information-based Feature Selection for Cyber Intrusion Detection, Hadis Karimipour (University of Guelph, Canada); Sara Mohammadi (Shahid Bahonar University of Kerman, Iran); Vraj Desai (University of Guelph, Canada).

Paper session 19: Power electronics II

Session chair: [Vijay K. Sood, University of Ontario Institute of Technology](#)

PE06: An Implementation of Cable Resistance in Modified Droop Control Method for Parallel-connected DC-DC Boost Converters, Muamer Shebani (Memorial University of Newfoundland, Canada); Tariq Iqbal (Memorial University of Newfoundland, Canada); John Quaicoe (Memorial University of Newfoundland, Canada).

PE07: Review of Digital Controllers in Power Converters, Jigneshkumar Patel (UOIT, Canada); Vijay K. Sood (University of Ontario Institute of Technology, Canada).

PE08: Real-time Closed-loop PQ Control of NPC Multi-level Converter Using OPAL-RT and Speedgoat Simulators, Atieh Delavari (Hydro-Québec/IREQ); Patrice Brunelle and Innocent Kamwa (Hydro-Québec/IREQ, Canada).

PE09: Controller Implementation and Performance Evaluation of a High Power Three-Phase Active Power Filter Using Controller Hardware-in-the-Loop Simulation, Hang Li (University of Manitoba, Canada).

PE10: Generalized Phase-Shift Pulsed Width Modulation for Multi-level Converters, Saeed Arazm (High Voltage Group, Canada); Hani Vahedi (Ecole de Technologie Supérieure, Canada); Kamal Al-Haddad (Ecole de technologie supérieure, Canada).

Paper session 20: Microgrids II

Session chair: Hadis Karimipour, University of Guelph

MG07: Prototype Microgrid Design and Results, Chandrabhanu Opathella and Bala Venkatesh (Ryerson University, Canada).

MG08: Energy Management System of a Microgrid Using Particle Swarm Optimization and Wireless Communication System, Mohammad Y Ali and Faizan Khan (UOIT, Canada); Vijay K. Sood (University of Ontario Institute of Technology, Canada).

MG09: Correlation Between Multiple VSG Sources for Enhancing the Power Allocation in Microgrid, Aazim Rasool (North China Electric Power University, Beijing, and Goldwind Science and Technology, Co. Ltd, Beijing, P.R. China); XiangWu Yan (North China Electric Power University, P.R. China); Haaris Rasool (National University of Computer and Emerging Science FAST Islamabad, Pakistan); HongXia Guo (Goldwind Science and Technology, Co. Ltd., Beijing, P.R. China).

MG10: Reactive Power Dispatch of Inverter-Based Renewable Distributed Generation for Optimal Feeder Operation, Monsef Tahir, MA (Waterloo, Canada); Ramadan A. El Shatshat and Maggy Salama (University of Waterloo, Canada).

MG11: Design and Field Implementation of a Multi-Agent System for Voltage Regulation Using Smart Inverters and Data Distribution Service (DDS), Shivam Saxena, Nader El-Taweel and Hany Farag (York University, Canada); Leigh Hilaire (Toronto Region and Conservation Authority, Canada).

Paper session 21: Miscellaneous

Session chair: Mojtaba Ashourloo, University of Toronto

MS01: Investigation of CO₂ Hydrate Generation Characteristics Based on the Development of a Power Generation System Using Atmospheric Heat, Toshiyuki Kawasaki (Kitami Institute of Technology, Japan); Shin'ya Obara (Kitami Institute of Technology, Japan); Yuta Uemura (Kitami Institute of Technology, Japan).

MS02: Temperature Control of MIMO Greenhouse System by Utilizing Ground Temperature and Weather Conditions, Raghad Alhusari (UAE University, United Arab Emirates); Farag Omar (UAU, United Arab Emirates); Moustafa Fadel (United Arab Emirates University, United Arab Emirates).

MS03: Uncertainty Analysis of Project Emissions, Abdollah Abdi and Sharareh Taghipour (Ryerson University, Canada).

MS04: Factors Affecting Electrical Submersible Pump Systems Operation, Xiaodong Liang (Memorial University of Newfoundland, Canada); Ahmad El-Kadri (Schlumberger, Singapore).

MS05: Can Linear Heat Sensors Be a Good and Practical Replacement of Traditional Protective Fuses?, Ali R. Al-Roomi (Dalhousie University, College of Engineering, Canada); Mohamed E. El-Hawary (Dalhousie University, Canada).

MS06: The Water Waste as a Source of Information for the Urban Agglomerations Management, Martina Drahošová and Peter Balco (Comenius University, Faculty of Management, Slovakia); Lukáš Pokorný and Ryan Razani (BPUG™ SLOVENSKO, Slovakia).