

2019 14th Conference on Industrial and Information Systems (ICIIS 2019)

**Kandy, Sri Lanka
18 – 20 December 2019**



**IEEE Catalog Number: CFP1958A-POD
ISBN: 978-1-7281-3707-0**

**Copyright © 2019 by the Institute of Electrical and Electronics Engineers, Inc.
All Rights Reserved**

Copyright and Reprint Permissions: Abstracting is permitted with credit to the source. Libraries are permitted to photocopy beyond the limit of U.S. copyright law for private use of patrons those articles in this volume that carry a code at the bottom of the first page, provided the per-copy fee indicated in the code is paid through Copyright Clearance Center, 222 Rosewood Drive, Danvers, MA 01923.

For other copying, reprint or republication permission, write to IEEE Copyrights Manager, IEEE Service Center, 445 Hoes Lane, Piscataway, NJ 08854. All rights reserved.

****** This is a print representation of what appears in the IEEE Digital Library. Some format issues inherent in the e-media version may also appear in this print version.***

IEEE Catalog Number:	CFP1958A-POD
ISBN (Print-On-Demand):	978-1-7281-3707-0
ISBN (Online):	978-1-7281-3706-3
ISSN:	2164-7011

Additional Copies of This Publication Are Available From:

Curran Associates, Inc
57 Morehouse Lane
Red Hook, NY 12571 USA
Phone: (845) 758-0400
Fax: (845) 758-2633
E-mail: curran@proceedings.com
Web: www.proceedings.com

CURRAN ASSOCIATES INC.
proceedings
.com

Table of Contents

Cover page	pp.
Copyright page	
International Advisory Committee	i
Conference organizing committee	ii
International review panel	ix
Message from the general chair	xiii
Table of contents	xiv

Session 01-Track A

13.00 – 15.00: 18th of December

Communications and Information Technology

Session Chair/ Co-chair: Prof. Disala Uduwawala, Dr. Aruna Gunawardane

Compact Beam-Steered Resonant-Cavity Antenna Using Near-Field Phase Transformation	1
Muhammad Usman Afzal, Ali Lalbakhsh and Karu Esselle	
A Novel Substrate Integrated Coaxial Line Ring Resonator Design and Performance Evaluation	5
Prabath Ranasinghe and Aruna Gunawardane	
Genetically Modified High Gain Sierpinski Carpet Fractal Antenna	11
Disala Uduwawala, Jeevani Jayasinghe and W.M.R.N.K. Naranpanawa	

Impact of Superstrate Size on the Radiation of a Microstrip Antenna 15
Jeevani Jayasinghe, V. Carrillo , Aurora Andújar and Jaume Anguera

Experimentally Observed Stimulated Brillouin Scattering and Optical Parametric Amplification in a Radio-over-fiber Link 20
K. I. Amila Sampath, Yushin Hayashi and Joji Maeda

Transmission Degradation in Wavelength-reuse WDM-PON Using Upstream OOK Re-modulation on DPSK Downstream 24
Akinori Kawai, K. I. Amila Sampath and Joji Maeda

Session 01-Track B

13.00 – 15.00: 18th of December

Computer, Embedded and Intelligent Systems and Data Engineering

Session Chair/ Co-chair: Prof. Mahesan Niranjana, Mr. Sampath Deegalla

Computational Inference of Microbial Interactions and Their Dynamics Rajith 28
Vidanaarachchi, Marnie Shaw and Saman K. Halgamuge

Data Analytics with Deep Neural Networks in Fog Computing Using TensorFlow and Google Cloud Platform 34
Buddhika Priyabhashana and Kudamaduwage Pubudu Jayasena

Named Entity Classification of Wikidata Items 40
Abdul Lathif Fathima Shanaz and Roshan G. Ragel

Potential Upselling Customer Prediction Through User Behavior Analysis Based on CDR Data 46
Madhawa Manchanayake, Pradeepa Samarasinghe, L.P.J.Perera,
H.M.M.T.Bandara, K.C.Kumaradasa, N.Premadasa and A.P.Samarasinghe

Session 01- Track C

13.00 – 15.00: 18th of December

Electronics, Instrumentation and Bio-medical Engineering

Session Chair/Co-chair: Dr. Lilantha Samaranyake, Dr. Achala Pallegedara

Ayurvedic Naadi Measurement and Diagnostic System	52
Jayani Umasha, Hashini Pulle, Ruvini Nisansala, Ruwan Ranaweera and Janaka V. Wijayakulasooriya	
Development of the Relationship between Hemoglobin Concentration and PPG Signal Characteristics	58
Ajmal Abdul Azees, Shankarnath Suthaharan, Kavisha Dinomi, Mohammadu Rizan Mohamed Athif and Eranda Jayatunga	
Design and Experimental Validation of an Optimized Wrist Powered 3D Printed Mechanical Trans-Metacarpal Prosthesis	63
Kanishka Kumaraage, Hirunaka Wickramarathna, Madhushan Vijesundaram, Mugilgeethan Vijendran, Neethan Ratnakumar and Tharsika Thanahaichelvan	
Electrical Impedance Tomography for Cross Sectional Imaging	69
Kasun Wijethilake and Janaka V. Wijayakulasooriya	
Patient-specific Walking Aiding Mechanism for a Patient with Paralyzed Hip: A Case Study	75
Dharshana A Athauda, Aruna Chandradeepa and Asela Ratnayake and Shanika M.A Arachchi	
Segmentation of Mental Foramen in Dental Panoramic Tomography Using Deep Learning	81
Chirath B. Dasanayaka, Bhasitha T. Dharmasena, Maheshi B. Dissanayake, Wikum R. Bandara and R. Jayasinghe	

Session 01-Track D

13.00 – 15.00: 18th of December

Power, Energy and High Voltage Engineering

Session Chairs/Co- Chair : Dr. Chandima Ekanayake, Dr. K.R.M.Nimal Ratnayake

Discharging Characteristics of a HVDC Test-Cable	85
Aritra Das and Chakradhar Reddy Chandupatla	
Effectiveness of Methods Practiced to Clean Biological Growth on MV Porcelain Insulators - A Case Study	91
Amila D. De Silva, J.R.S.S. Kumara, H.M.V.R. Herath, M.A.R.M. Fernando and Sarangi Athukorala	
Effect of Non-Linear Permittivity on Electric Field in Multi-layer Dielectrics in Cylindrical Geometry	97
Pranav Johri and Chakradhar Reddy Chandupatla	
Condition Assessment of HV Circuit Breaker Contacts Using Dynamic Resistance Measurements	101
Kushan G. Weerasekera, Kapila Bandara, J.R.S.S. Kumara and M.A.R.M. Fernando	
Application of Signal Processing Techniques for Modeling of Slot Discharges in Generators	107
E.M.U.N. Ekanayake, H.M.N.P. Herath, G.C. Perera, J.V. Wijekulasooriya, J.R.S.S. Kumara, M.A.R.M. Fernando and K.M.K.S. Bandara	
Identification of Reasons for Short Circuit Development and Bulge Deformations in Salient Pole Field Winding- A Case Study	113
Amal S. Ariyaratne, Kapila Bandara and J.R.S.S. Kumara	
Optimizing Medium Voltage Underground Distribution Network with Minimized Sheath and Armor Losses	119
Anuradha H. Ariyasinghe, Chandana Warnakulasuriya, J.R.S.S. Kumara and M.A.R.M. Fernando	

Session 01-Track E

13.00 – 15.00: 18th of December

Signal and Image Processing

Session Chair/ Co-chair : Dr. Roshan Godaliyadda, Dr. Nalin Harischandra

Identification of Medicinal Plants by Visual Characteristics of Leaves and Flowers	125
Danushi Jayalath, Dhanuka Nadeeshan, Geeshani Amarawanshaline, Hasini Jayasuriya and Dasuni P. Nawinna	
Feature Extraction Using Minor Scatter Directions of Data to Distinguish Between Classes with Minute Differences of a Hyperspectral Image	130
E.M.M.B. Ekanayake, W. G. C. Bandara, G. W. K. Prabhath, G. M. R. I. Godaliyadda, H. M. V. R. Herath and M. P. B. Ekanayake	
Hyperspectral Imaging Based Method to Identify Potential Limestone Deposits	135
Yasiru L. Ranasinghe, H. M. Lakmal, Hashan Weerasooriya, E.M.M.B. Ekanayake, G. M. R. I. Godaliyadda, H. M. V. R. Herath and M. P. B. Ekanayake	
Machine Learning Approach to Improve Flower Classification Using Multiple Feature Set	141
Kishotha Sivakumar and Barathy Mayurathan	
Real-Time Mobile Vehicle License Plates Recognition in Sri Lankan Conditions	146
Layan Chathuranga and G.D.S.P. Wimalarathne	
Digital Creation of Color Illusion Fabricated by Overlaying Different Colored Translucent Textiles Using Images	151
Anjana Wijesinghe, Lasantha Seneviratne and Sunil G. Abeyratne	

Session 02-Track A

15.30 – 17.00: 18th of December

Communications and Information Technology

Session Chair/ Co-chair: Prof. Sudharman Jayaweera, Dr. Vijitha Herath

Invited Paper : The Aspects of Doppler Assisted Wireless Communication 157
Dushyantha A. Basnayaka

A Review on Cellular Network Infrastructure Evolution: Challenges and Opportunities 163
Sameer Kumar Singh, Rohit Singh and Brijesh Kumbhani

Joint Channel-Network Coding in Unequally Error Protected Multi-Way Wireless Relay Systems 169
Nuwan Balasuriya and Chandika B. Wavegedara

An Improved Indoor Localization Algorithm with Neighbour Fusion 175
Madhuka Bandara and Nuwan Balasuriya

Session 02-Track B

15.30 – 17.00: 18th of December

Computer, Embedded and Intelligent Systems and Data Engineering

Session Chair/ Co-chair: Prof. Roshan Ragel, Prof. Roshan Yapa

Smart Protector: A Real-time Theft Prevention System for Transportation Management 180
Lahiru J Ekanayake, Ruwan D. Nawarathna, Prabhath Gunathilake, Roshan Yapa and Amalka J. Pinidiyaarachchi

Optical Character Translation Using Spectacles (OCTS) 186
Kanagasabai Thiruthanigesan and Roshan G. Ragel

An Integrated Platform of Water Quality Management for National Water Supply and Drainage Board 192
Sathira Hettiarachchi, Divan Proboshena, Lakshan Stembo, Hashan Rajapaksha, Rajitha de Silva and Dasuni P. Nawinna

Design and Optimization of IoT Based Smart Irrigation System in Sri Lanka 198
H. G. Chandana Ruwan Laksiri, Chathuriaka Dharmagunawardhane and Janaka V. Wijayakulasooriya

A Queuing Model for Outpatient Department to Reduce Unnecessary Waiting Times 203
Nishshanka B. Weerakoon, Shanmuganathan Vasanthapriyan and U.A. Piumi Ishanka

Session 02-Track C
15.30 – 17.00: 18th of December

Electronics, Instrumentation and Bio-medical Engineering
Session Chair/ Co-chair: Dr. Ruwan Ranaweera, Dr. Lilantha Samaranayake

Invited Paper: IoT Platforms and Hardware Integrations for Industry 4.0 Applications 209
N. Athula Kulathunga and Daniel J.B.S. Sampaio

A Novel Double Source TFET for Low Power Application 215
Bijoy Goswami, Ayan Bhattacharya, Komal Kumari, Priyadarshini Das, Wasim Reja and Subir Kumar Sarkar

Simulation of a Three-Port Bi-Directional Converter for an Electric Vehicle Application 220
Eshan Karunarathne, Lilantha Samaranayake, Prabath J. Binduhewa and Janaka B. Ekanayake

Micro-electromechanical System (MEMS) Based Micro-Cantilever Sensing Platforms for Explosive Detection 226
Venika Ekanayake, Achala Pallegedara and Lakmal Kumara

Review of Vibration Signal Processing Techniques for Bearing Condition Monitoring N/A
Ankush C.Jahagirdar, S.Mohanty and Karunesh K. Gupta

Session 02-Track D

15.30 – 17.00: 18th of December

Power, Energy and High Voltage Engineering

Session Chair/Co-Chair: Prof. C.C. Reddy, Dr. Prabath Binduhewa

Design and Implementation of a Laboratory Prototype of a Modular Multilevel Converter with Embedded Storage 234
Nuwan Herath and Shaahin Filizadeh

Harmonic Analysis of New Breaker Switched Capacitor Bank Installations: A Case Study 239
Dilith Sooriyagoda, J.R.S.S. Kumara, U. S. Navaratne and M.A.R.M. Fernando

Reactive Power Compensation for Voltage Violations in Distribution Network 245
Aranee Balachandran, G. W. Kasun Prabath, W. G. Chaminda Bandara, G.M.R.I. Godaliyadda, M.P.B. Ekanayake and Janaka B. Ekanayake

Comparative Analysis of LMS, Block LMS and RLS Adaptive Control Methods for Shunt Voltage Source Converter 251
Birender Singh and Chakradhar Reddy Chandupatla

Fuel Saving with a Hybrid Power System for an Electric Ferry 255
Shantha Jayasinghe Arachchillage, U.Suryawansi, A.Sheikh and S.Alahakoon

Session 02-Track E

15.30 – 17.00: 18th of December

Signal and Image Processing

Session Chair/Co-chair: Dr. Jagath Kumara, Dr. M.P.B. Ekanayake

- Non-contact Infant Sleep Apnea Detection** 260
Gihan Jayatilaka, Harshana Weligampola, Suren Sritharan, Pankayaraj Pathmanathan, Roshan G. Ragel and Isuru Nawinne
- Fetal Movements Identification Based on Non-negative Matrix Factorization and Spectral Clustering** 266
Wishmi Wasalaarachchi, Anupama Subhashini, Sachitha Abeywardhana, Samitha Gunarathne, Thanushi Withanage, G. M. R. I. Godaliyadda, M. P. B. Ekanayake, Janaka V. Wijayakulasooriya and Chathura Rathnayake
- EyeDriver: Intelligent Driver Assistance System** 272
Prabas Gayadeeptha, Tharindu P. Baddewithana, Kalpana V. Pannegama, Chamari S. Samarakkody, Pradeepa Samarasinghe and Samantha Siriwardana
- Classification of Activities of Daily Living Based on Depth Sequences and Audio** 278
Chathuranga Siriwardhana, Danushka Madhuranga, Rivindu Madushan and Kutila Gunasekera
-

Session 03-Track A

08.30 – 10.00: 19th of December

Communications and Information Technology

Session Chair/ Co-chair: Prof. Kithsiri Liyanage, Assistant Prof. K.I. Amila Sampath

- Invited Paper: Multi-task Deep Reinforcement Learning for Cognitive Spectrum-agile Communications** 284
Mohamed A. Aref and Sudharman K. Jayaweera
- Towards IoT; Comparison of RSS Based Indoor Localization Using Supervised Learning and Trilateration in WSN** 290
Yohan Praveen Weerasinghe and Maheshi B. Dissanayake

Power Allocation and Performance analysis of Multiuser NOMA Under NYUSIM Channel Model	296
Asif Mahmood and Muhammad Zeeshan	
A Community Based Routing Algorithm for Mobile Opportunistic Networks	302
Dushmanthi Madushani Fernando and Thabotharan Kathiravelu	
Novel Impairment - Aware Resource Allocation Scheme for Elastic Optical Networks Serving Traffic with Different Service Priorities	308
Kusala Munasinghe, Madushanka N. Dharmaweera, Chamitha de Alwis and Uditha Wijewardhana	

Session 03-Track B

08.30 – 10.00: 19th of December

Computer, Embedded and Intelligent Systems and Data Engineering

Session Chair/ Co-chair: Prof. Mahesan Niranjana, Dr. Damayanthi Herath

Deep Learning Approach to Detect Plagiarism in Sinhala Text	314
K. A. Tharuka Chathurani and E. Y. Andrew Charles	
Sentiment Analysis in Tamil Texts: A Study on Machine Learning Techniques and Feature Representation	320
Sajeetha Thavareesan and Sinnathamby Mahesan	
A Rule Based Stemmer for Sinhala Language	326
Pavithra M. Kariyawasam, Shashini Y. Senanayake and Prasanna S. Haddela	
A Multi-language Platform for Generating Algebraic Mathematical Word Problems	332
Vijini Liyanage and Surangika Ranathunga	
A Space-Filler Mechanism to Recognize Body Language of Hands	338
Chapa S. Hewa Pelendage, Buddhika P. Jayasekara and Dedduwa P. Chandima	

Session 03-Track C

08.30 – 10.00: 19th of December

Computer, Embedded and Intelligent Systems and Data Engineering

Session Chairs/ Co-chair: Dr. Asitha Bandaranayake, Dr. Janaka Alawatugoda

A Convolutional Neural Network and A Feature Encoding Approach for Predicting the Outcome of Cricket Matches 344

Siyamalan Manivannan and Kausik Mogan

Effective Mechanism to Mitigate Injuries during NFL Plays 350

Arraamuthan Arulanantham, Ahamed A. A. Anzar, Gowshalini Rajalingam, Krusanth Ingran and Prasanna S. Haddela

A Method to Identify the Current Mood of Social Media Users 356

Supuni Weerasinghe and Supunmali Ahangama

Machine Learning for Emotion Classification of Sri Lankan Folk Music 360

Charles Joseph and Sugeeswari Lekamge

Session 03-Track D

08.30 – 10.00: 19th of December

Controls, Robotics and Automation

Session Chairs/ Co-chair: Dr. Lilantha Samaranyake, Dr. Nalin Harischandra

A Redundant Trans-humeral Ortho-prosthesis with Novel Shoulder Orthosis for Human like Motion Generation 366

Achintha Abayasiri and R. A. Ruwan Chandra Gopura

Hydrodynamic Modelling and Adaptive Control for a Complex-Shaped Underwater Vehicle 372

Chanaka T. Bandara, Asanga Ratnaweera and Sanjeeva Maitripala

Development of Vision Aided Automated Ball Retrieving Robot for Tennis Training Sessions 378

Dulanjana M Perera, Dilshan Menaka, Kolitha M. Surasinghe, Kanishka Madusanka, Thilina Lalitharatne

Evaluation of Underwater Vehicle's Self-Localization Based on Visual Odometry or Sensor Odometry	384
Yoshiki Tanaka, Akio Semmyo, Yuya Nishida, Shinsuke Yasukawe, Jyonghyon Ahn, Kazuo Ishin	

Session 03-Track E

08.30 – 10.00: 19th of December

Power, Energy and High Voltage Engineering

Session Chair/Co- Chair: Prof. Janaka Ekanayake, Prof. Sunil Abeyrathne

Investigation of Solar PV Hosting Capacity in LV Distribution Networks	390
Namal Maduranga, Upuli Jayatunga, Lasith Maddumage, Gihani Kaushalya and Dinusha Liyanage	

Power Quality Issues Due to High Penetration of Rooftop Solar PV in Low Voltage Distribution Networks: A Case Study	395
Hasini De Silva, Shan Jayamaha and Nilakshi Lidula	

Operation of Battery Energy Storage Systems Considering Transmission Network in Bulk Power System with Large-scale Photovoltaic Systems	401
Taisuke Masuta, Eri Mizukami, Kohei Takahashi, Rajitha Udawalpola , Nobuyuki Yamaguchi and Hideaki Ohtake	

A Review on MVdc Collection Systems for High Power Offshore Wind Farms	407
Gayan Abeynayake, Gen Li, Jun Liang and Nicolaos A. Cutululis	

Assessment of Voltage and Current Quality Indices of Grid Connected Solar PV Plants Against International Standards	413
Vigna K. Ramachandaramurthy, Aref Pouryekta, Jia Y. Yong, Kang M. Tan, Akila E. Jayasinghe and Janaka B. Ekanayake	

Use of Probabilistic Fuzzy Inference Systems to Model Demand Response in the Off-grid Power Systems of Northern Canada	419
Roshani Kaluthanthrige and Athula Rajapakse	

Session 03 -Track F

08.30 – 10.00: 19th of December

Signal and Image Processing

Session Chairs/ Co-chair : Dr. Janaka Wijayakulasooriya, Dr. Maheshi Dissanayake

Gaussian Filtered Gait Energy Template and Centroid Corner Distance Features for Human Gait Recognition	425
R. Anusha and C. D. Jaidhar	
FPGA Implementation of the Trigger Based on a Fuzzy Logic for a Detection of Cosmic Rays in Water Cherenkov Detectors	431
Zbigniew Szadkowski and Anna Szadkowska	
Fine-Tuned Line Connection Accompanied Boolean Expression Generation for Hand-Drawn Logic Circuits	436
Thisaru Dhanushika and Lochandaka Ranathunga	
A New DSLR Camera Autofocusing Algorithm Based on Colour Information	442
Hashini Athauda and Nuwan Balasuriya	
ATHWELA: Gamification Supportive Tool for Special Educational Centers in Sri Lanka	446
Piumi Nisansala and Achini Morawaka	

Session 04 -Track A

11.30 – 12.30: 19th of December

Communications and Information Technology

Session Chair/ Co-chair: Dr.Uthpala Premarathne , Assistant Prof. Brijesh Kumbhani

Evolutionary Ontology Approach for Sinhala Essay Question Generation 452
Supun M. Amarasinghe and Lochandaka Ranathunga

Stimme: A Chat Application for Communicating with Hearing Impaired Persons 458
Akarshani Amarasinghe and Viraj B. Wijesuriya

Smartphone-based Approach to Enhance Mindfulness among Undergraduates with Stress 464
Samantha Thelijigoda, Yasitha Edirisooriya, Tharaka Ariyasena, Navodya Jayawickrama, Anuththara Rathnayake and Iresha Donmanige

Residual Energy Aware Trust Computation Method for Social Internet of Things 470
Uthpala Premarathne

Session 04-Track B

11.30 – 12.30: 19th of December

Computer, Embedded and Intelligent Systems and Data Engineering

Session Chair/Co-chair: Mr. Sampath Deegalla, Dr. Janaka Alawatugoda

Pubudu: Deep Learning Based Screening and Intervention of Dyslexia, Dysgraphia and Dyscalculia 476
Madhuka Nadeeshani, Ruchira Dhananjaya Kariyawasam, Tuan Hamid, Inisha Subasinghe, Pradeepa Samarasinghe and Pasangi Ratnayake

Machine Learning Based Domain Specific Information Retrieval Accuracy Measuring System for Legal Domain N/A
Keet Sugathadasa, Buddhi Ayesha, Nisansa D de Silva, Shehan Perera, Vindula Jayawardana and Dimuthu Lakmal

Multi-Step-Ahead Prediction of Exchange Rates Using Artificial Neural Networks: A Study on Selected Sri Lankan Foreign Exchange Rates 488
Aravinda J. P. Samarawickrama and T.G.I Fernando

Optimizing the Electrical Wire Routing Through Multiple Points Using Multi Objective Ant Colony Algorithms for Electrical Wire Routing (MOACS- EWR) 494
Punsisi Pamarathne and Gishantha Fernando

Session 04-Track C

11.30 – 12.30: 19th of December

Computer, Embedded and Intelligent Systems and Data Engineering

Session Chair/Co-Chair: Dr. Bhanu Soumya, Prof. Roshan Ragel

Fault-tolerant Application-Specific Network-on-Chip Design Using Discrete Particle Swarm Optimization 500
P. Veda Bhanu and Soumya J.

Hardware and Software Co-design for Object Detection with Modified Vibe Algorithm and Particle Filtering Based Object Tracking 506
Yasitha M. Wijesinghe, Jayathu Samarawickrama and Dileeka Dias

A Toolkit for Building Cross-Platform Migratory Software Applications 512
Lakshitha Rajapakse, Rajitha Kumara, Shehan Karunarathna and Kutila Gunasekera

Session 04-Track D

11.30 – 12.30: 19th of December

Controls, Robotics and Automation

Session Chair/Co-Chair: Dr. Asanga Ratnaweera, Dr.Sudheera Navaratne

Performance Comparison and Validation of Controllers for an Inverted Pendulum System 518

Chanaka T. Bandara, Pamoda Herath, Chandana R. Laksiri and Asanga Ratnaweera

A Comparison of Fuzzy Logic Controller and PID Controller for Differential Drive Wall-Following Mobile Robot 523

Namal Rathnayake, Subashini De Silva and Chamanthi Rodrigo

Entropy-based Exposure Time Setting for an Adaptive Multi-Exposure Image Fusion 529

Shinsuke Yasukawa, Tomohiro Nasuno and Kazuo Ishii

Session 04-Track E

11.30 – 12.30: 19th of December

Power, Energy and High Voltage Engineering

Session Chairs: Prof. Athula Rajapakse, Prof. Manjula Fernando

Three-Dimensional Implementation of Modified Rolling Sphere Method for Lightning Protection of Giant Medieval Chola Monument in South India 535

Venkatesh Srinivasan, Thirumalini Selvaraj, Shashank Chandrasekaran, Srisailam Sreedhar, Kunal Kakria, M.A.R.M. Fernando and J.R.S.S. Kumara

Possible Lightning Hazards to Humans near Giant Ancient Stupa 541

Hasitha Rajapaksha, J. R. S. S. Kumara, M. A. R. M. Fernando, Saman Susantha, Dickovita Kankanamge, Venkatesh Srinivasan and D.K Jayarathne

Optimal Residential Load Scheduling in Dynamic Tariff Environment 547

Lakmini R. Senarathne, Prabodi Senevirathne, I.U. Muthunaike, Uditha S. Navaratne and Janaka V. Wijayakulasooriya and H.A.C Dharmagunawardana.

**Voltage-Loss Sensitivity Based Approach for Optimal DG Placement in
Distribution Networks**

553

Jayaminda Anuradha, Upuli Jayatunga and H. Y. Ranjit Perera
