



RESEARCH PRODUCTIVITY (2016)

2016 List of Research Publications

DHET Accredited Journal Paper

- [1] N. K. Chetty, L. Chonco, L. Chetty, T. Govender, R. Parboosing and I. E. Davidson, "Analysis of Corona Discharge Current Pulses in HeLa-Cell Permeabilization due to High Voltage DC Corona". *IEEE Transactions on Nano Bioscience*, Vol. 15, No. 6, September 2016, pp. 526-532.

Non-DHET Journal Papers

- [2] E. Hamatwi, C. N. Nyirenda and I. E. Davidson, "Optimization of a Hybrid PV-Diesel System for Rural Application: The Case of Oluundje Village, Namibia" *International Science and Technology Journal of Namibia*, Vol 8, pp. 117-132, 2016.
- [3] O.E. Oni, K.N.I. Mbangula and I.E. Davidson, "A Review of LCC-HVDC and VSC-HVDC Technologies and Applications". *Transactions on Environment and Electrical Engineering*, Vol. 1, No 3, Sept. 2016, pp 68-76. ISSN 2450-5730, a peer-reviewed, open access (OA) interdisciplinary journal.
- [4] O.E. Oni, K.N.I. Mbangula and I.E. Davidson, "Dynamic Voltage Stability Studies using a Modified IEEE 30-Bus System". *Transactions on Environment and Electrical Engineering*, Vol 1, No 3, 2016 Sept. 2016, pp. 41-49. ISSN 2450-5730, a peer-reviewed, open access (OA) interdisciplinary journal.

Refereed Conference Proceedings

- [1] M Gumede and G. F. d'Almaine. "Partial Discharge Analysis in Laboratory on ZnO Varistors Elements". *Proceedings of the 24th South African Universities Power Engineering Conference (SAUPEC)*, Vanderbijlpark, South Africa, 26-28 January 2016, pp.350-355.
- [2] K.T. Akindeji, and I. E. Davidson, "Microgrid and Active Management of Distribution Networks with Renewable Energy Sources". *Proceedings of the 24th South African Universities Power Engineering Conference (SAUPEC)*, Vanderbijlpark, South Africa, 26-28 January 2016, pp.171-175.
- [3] M P Lokothrowo and G.F. d'Almaine. "Reliability Centred Maintenance (RCM) Model Implementation to eThekweni Electricity Network". *Proceedings of the 24th South African Universities Power Engineering Conference (SAUPEC)*, Vanderbijlpark, South Africa, 26-28 January 2016, pp.176-180.

- [4] E. Hamatwi, I.E. Davidson and M.N. Gitau, "Modeling and Control of Voltage Source Converters for Grid Integration of a Wind Turbine System". *Proceedings of the IEEE PES Power Africa Conference*, Livingstone, Zambia, 28 June - 2 July 2016, pages 98-106.
- [5] C. Subramani, A. A. Jimoh, M. Sudheesh and Innocent E. Davidson, "Fault Investigation Methods on Power Transmission Line: A Comparative Study". *Proceedings of the IEEE PES Power Africa Conference*, Livingstone, Zambia, 28 June - 2 July 2016, pages 93-97.
- [6] E. Hamatwi, I.E. Davidson, M.N. Gitau, R. Vajeth and K. Pickster, "Power Control Techniques in Voltage Source Converters for Grid Integration of Wind Energy". *Proceedings of the 3rd Eskom Power Plant Engineering Institute Student Workshop*, Eskom Academy of Learning, Midrand, South Africa, 11-12 July 2016.
- [7] U. Iruansi, J.R. Tapamo, I.E. Davidson and M. Khan, "Polymeric Insulator Condition Analysis Based on Hydrophobicity". *Proceedings of the 3rd Eskom Power Plant Engineering Institute Student Workshop*, Eskom Academy of Learning, Midrand, South Africa, 11-12 July 2016.
- [8] S Khan and I.E. Davidson, "Underground Pumped Hydroelectric Energy Storage in South Africa using Aquifers and Existing Infrastructure". *Proceedings of the NEIS Conference 2016 on Sustainable Energy Supply and Energy Storage Systems*, Hamburg, Germany, 15-16 September 2016.
- [9] D Chetty, M.M. Bello and I.E. Davidson, "The Application of Volt/VAr Optimization on Eskom South Africa Distribution Feeders" *Proceedings of the 2016 CIGRE Canada Conference*, Vancouver, BC, Oct 17-19, 2016.
- [10] E. Hamatwi, I.E. Davidson and M N Gitau, "Control of Multi-Level Voltage Source Converters Integrating a Wind Turbine System into the Grid". *Proceedings of the 5th International Conference on Renewable Energy Research and Applications*, Birmingham, United Kingdom, 20-22 November 2016.
- [11] OE Oni, N Parus and I.E. Davidson, "Voltage Stability Analysis of Eskom Eastern Grid High Voltage Transmission Grid". *Proceedings of the 5th International Conference on Renewable Energy Research and Applications*, Birmingham, United Kingdom, 20-22 November 2016.
- [12] S Sewchurran and I.E. Davidson, "Optimisation and Financial Viability of Landfill Gas to Electricity Projects in South Africa". *Proceedings of the 5th International Conference on Renewable Energy Research and Applications*, Birmingham, United Kingdom, 20-22 November 2016.
- [13] S Sewchurran and I.E. Davidson, "Guiding Principles for Grid Code Compliance of Large Utility Scale Renewable Power Plant Integration onto South Africa's Transmission/Distribution Networks". *Proceedings of the 5th International Conference on Renewable Energy Research and Applications*, Birmingham, United Kingdom, 20-22 November 2016.

Higher Degrees Graduated in other Institutions (UKZN) Doctor of Philosophy (2016)

Chetty, Nevendra Krishniah, *BSc, BScHons, MSc* *Electrical Engineering*
 Dissertation: DC Corona Electroporation
 Supervisors: **Dr IE Davidson** and Professor T Govender

Nyete, Abraham Mutunga, *BEng (UNairobi), MScEng*..... *Electronic Engineering*
 Dissertation: A Flexible Statistical Framework for the Characterization and Modelling of Noise in Powerline Communication Channels.
 Supervisors: Professor TJO Afullo and **Dr IE Davidson**

Master of Science in Engineering (2016)

Botha, Larry Chama Chidza, *BEng (CopperbeltU)* *Mechanical Engineering*
 Dissertation: Effect of Fretting Marks Introduced During Strand Winding on the Fatigue Performance of Transmission Line Conductors
 Supervisors: Dr RC Loubser and **Dr IE Davidson**

Dumakude, Gugulethu Carol, *BTech (DUT)*..... *Electrical Engineering*
 Dissertation: Evaluation of a Smart Technology for the Improvement of Reliability in a Power Distribution System.
 Supervisors: Dr AG Swanson and **Dr IE Davidson**

Ilunga, Kayumba Grace, BScEng (ULubumbashi)..... Electrical Engineering

Dissertation: Influence of Fire on DC Corona Current

Supervisors: **Dr IE Davidson** and Dr L Chetty

Khan, Shiraz Yusuf, BTech (DUT)..... Electric Power and Energy Systems

Dissertation: A Comparative Study and Analysis of PHES and UGPES Systems.

Supervisor: **Dr IE Davidson**

Malapermal, Sanjian, BScEng..... Electric Power and Energy Systems

Dissertation: A Methodology for Optimal Placement of Distributed Generation on Meshed Networks to Reduce Power Losses for Time Variant Loads.

Supervisors: **Dr IE Davidson** and Mr. MM Bello

*** Mbangula, Kamati Nghilifavali, BScHons (UNamibia)..... Electrical Engineering**

Dissertation: Investigating the effects of HVDC Transmission Schemes on Eskom's Network Transient Rotor Angle and Voltage Stability

Supervisors: **Dr IE Davidson** and Dr R Tiako

Mtolo, Patrick Dumsani, BScEng..... Electric Power and Energy Systems

Dissertation: The Safety Risk Assessment and Mitigation of the LV Networks with Embedded Generators.

Supervisor: **Dr IE Davidson**

Mwale, Stacey Juliana Tombozi, BSc (UNamibia)..... Electrical Engineering

Dissertation: The Southern African Power Pool (SAPP) Steady State Security Assessment Using Contingency Analysis.

Supervisor: **Dr IE Davidson**

Williamson, Andrew Robert Faure, BScEng (Wits)..... Electric Power and Energy Systems

Dissertation: Field-effect Limits and Design Parameters for Hybrid HVDC/HVAC Transmission Lines

Supervisor: **Dr IE Davidson**

Research Grants

- [1] Principal Investigator: Mr Timothy Akindeji: Eskom TESP Grant (RTPSS Centre): R90 000.00.
- [2] Principal Investigator: Mr Dwayne Reddy; Eskom TESP Grant (Photovoltaics): R30 000.00.
- [3] Principal Investigator: Mrs Nomhle Loji; Eskom TESP Grant (Energy Storage): R30 000.00.
- [4] Principal Investigator: Prof IE Davidson; Eskom TESP Grant (Smart Grids): R70 000.00; Eskom TESP Grant (HVDC): R70 000.00.
- [5] Principal Investigator: Ms N Mazibuko; Eskom TESP Grant (Renewable Energy): R50 000.00.
- [6] Principal Investigator: Mr. Kabulo Loji; Eskom TESP Grant (Renewable Energy): R30 000.00.
- [7] Co-Investigator: Mr Timothy Akindeji: Newton Fund: R274 920.56
- [8] Co-Investigator: Prof IE Davidson; Royal Academy of Engineering United Kingdom Award (2017 – 2019); Grant Amount: £140 000.00.
- [9] Faculty Researcher of the Year Award, Prof IE Davidson, Grant Amount: R7 500.00.
- [10] DHET-Accredited Outputs Research Incentive Award 2017: Prof IE Davidson, Grant Amount: R36 855.38.
- [11] DHET-Accredited Outputs Research Incentive Award 2018: Prof IE Davidson, Grant Amount: R171 105.98.
- [12] DUT Conference Travel Grant: Prof IE Davidson, 2018 Conference Travel Award: R10 000.00.
- [13] DUT Conference Travel Grant: Elutunji Buraimoh, DEng Student, 2018 Conference Travel Award: R10 000.00.
- [14] DUT Conference Travel Grant: Sindi Malanda, MEng Student, 2018 Conference Travel Award: R9385.70.