

# Optimization for Distributed Generation Planning in Radial Distribution Network using MVMO-SH

*N. Md. Saad, M. Z. Sujod, M. F. Abas, M.I.M. Ridzuan*

Faculty of Electrical & Electronics Engineering Universiti Malaysia Pahang Malaysia

[norhafidzah@ump.edu.my](mailto:norhafidzah@ump.edu.my), [zahim@ump.edu.my](mailto:zahim@ump.edu.my), [mfadhil@ump.edu.my](mailto:mfadhil@ump.edu.my),  
[ikhwanr@ump.edu.my](mailto:ikhwanr@ump.edu.my)

## ABSTRACT

The MVMO-SH method for optimization of distributed generation (DG) planning in the radial distribution network is proposed. A backward – forward sweep power flow method (BFSPF) is presented to calculate the power losses of the branches and determine the voltage magnitudes of each bus. The optimum size and location of DG are determined based on the power loss minimization. The corresponding APL index is computed for each bus to evaluate the size of DG at different location in the network. The DG location is chosen based on the minimum value of the corresponding APL index. For validation, the MVMO-SH are compared with the PSO and GA approaches. The optimization of DG using MVMO-SH is tested on the IEEE 33 – bus and IEEE 69 – bus radial distribution networks (RDN) and the results are perceived very competitive with the results obtained by PSO and GA optimization method.

**KEYWORDS:** Hybrid variant-mean-variance mapping optimization (MVMO-SH), distributed generation, backward forward sweep power flow (BFSPF), power loss minimization, active power loss (APL) index, radial distribution network.

**DOI:** <https://doi.org/10.1109/ICSGRC.2019.8837082>

## **ACKNOWLEDGMENT**

The authors would like to acknowledge the Government of Malaysia and Universiti Malaysia Pahang through the Post-Graduate Research Scheme vote PGRS190319.