Power flow in four-wire distribution networks - General approach

DOI:

[10.1109/PES.2004.1372952](https://doi.org/10.1109/PES.2004.1372952)

[Link to publication record in Manchester Research Explorer](#)

Citation for published version (APA):

Ciric, R. M., Padilha-Feltrin, A., & Ochoa, L. F. (2004). Power flow in four-wire distribution networks - General approach. In *IEEE/PES General Meeting 2004* (pp. 1-1) <https://doi.org/10.1109/PES.2004.1372952>

Published in:

IEEE/PES General Meeting 2004

Citing this paper

Please note that where the full-text provided on Manchester Research Explorer is the Author Accepted Manuscript or Proof version this may differ from the final Published version. If citing, it is advised that you check and use the publisher's definitive version.

General rights

Copyright and moral rights for the publications made accessible in the Research Explorer are retained by the authors and/or other copyright owners and it is a condition of accessing publications that users recognise and abide by the legal requirements associated with these rights.

Takedown policy

If you believe that this document breaches copyright please refer to the University of Manchester's Takedown Procedures [<http://man.ac.uk/04Y6Bo>] or contact uml.scholarlycommunications@manchester.ac.uk providing relevant details, so we can investigate your claim.

Power Flow in Four-Wire Distribution Networks - General ApproachRade Ciric¹, **Antonio Padilha**¹, Luis Ochoa¹¹Universidade Estadual Paulista

The neutral wire in most power flow software is usually merged into phase wires using Kron's reduction. Since the neutral wire and the ground are not explicitly represented, neutral wire and ground currents and voltages remain unknown. In some applications, like power quality and safety analyses, loss analysis, etc., knowing the neutral wire and ground currents and voltages could be of special interest. In this paper, a general power flow algorithm for three-phase four-wire radial distribution networks, considering neutral grounding, based on backward-forward technique, is proposed. In this novel use of the technique, both the neutral wire and ground are explicitly represented. A problem of three-phase distribution system with earth return, as a special case of a four-wire network, is also elucidated. Results obtained from several case studies using medium and low voltage test feeders with unbalanced load, are presented and discussed.