

# **Reconfiguration of large-scale distribution networks for planning studies**

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## **Abstract-**

**Medium Voltage (MV) distribution networks are usually operated radially. However, its structure may be designed meshed, so that in case of a failure of an element, the load downstream can be supplied by adjacent feeders through reconfiguration of the network. Under this assumption, a reconfiguration tool is a key resource for the planning and the operation of MV distribution networks. This paper presents a heuristic reconfiguration algorithm of MV distribution networks. The algorithm determines the configuration that minimizes the Non Delivered Power not only in case of the failure of a single branch (line, transformer) but also in case of a complete failure of a high voltage to medium voltage substation. The constraints considered are that the radial structure of the network must be maintained and that line thermal limits, transformer capacities and bus voltages must be within their admissible ranges. The results of the algorithm show up weak regions of the network where planning actions should be carried out. The main features of the algorithm are interpretability of the solution and low computation times while handling complex and large-scale MV distribution networks. The algorithm has been tested on several actual distribution networks. Results of the application of the algorithm to real scenarios of Madrid's distribution network are provided.**

**Index Terms-** Heuristic Algorithm, Power Distribution Planning, Power System Restoration, Reconfiguration

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