

Optimal Protection Coordination in Distribution Systems with Distributed Generations

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Abstract : The advantages of distributed generations (DGs) based on renewable energy sources (RESs) leads to high penetration level of DGs in distribution network. With incorporation of DGs in distribution systems, the system reliability and security, as well as voltage profile, is improved. However, the protection of such systems is still challenging. In this paper, at first, the related papers are reviewed and then a practical scheme is proposed for coordination of OCRs in distribution system with DGs. The coordination problem is formulated as a nonlinear programming (NLP) optimization problem with the object function of minimizing total operating time of OCRs. The proposed method is studied based on a simple test system. The optimization problem is solved by General Algebraic Modeling System (GAMS) to calculate the optimal time dial setting (TDS) and also pickup current setting of OCRs. The results show the effectiveness of the proposed method and its applicability.

Keywords : distributed generation, DG, distribution network, over current relay, OCR, protection coordination, pickup current, time dial setting, TDS

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