University of Zabol
Faculty of Technical Engineering
Master's thesis in electrical engineering
The trend of power systems

Title:
Investigating the resilience of the power system by considering the presence of scattered production and energy sources

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Abstract:

In recent years, with the expansion of the electrical grid and the increase in shared consumption demand, the importance of transmission and distribution costs has grown. The losses in distribution networks, due to the dispersion of distribution lines and the resulting voltage drops at more distant network points, are higher than in other parts of the network. Consequently, reducing these losses is of significant importance. Additionally, maintaining voltage within an acceptable range and having a stable voltage profile are always critical.

Utilizing distributed generation resources of appropriate size and logical placement can substantially reduce losses and maintain voltage profiles. Therefore, this paper addresses the reduction of losses and the improvement of voltage profiles by using distributed generation resources close to the load. MATLAB software is employed to analyze the reduction of losses and the enhancement of voltage profiles. Accordingly, an optimization algorithm is introduced, which, based on electrical losses, voltage profiles, and the cost of fuel for distributed generation resources, provides an optimized approach aimed at reducing losses.

Keywords: Electrical distribution network, Distribution losses, Voltage profile, Optimization algorithm, System efficiency improvement.