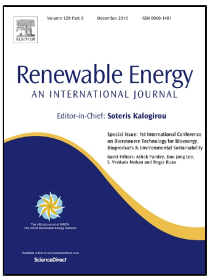
Accepted Manuscript



Multi-Objective Stochastic Model for Joint Optimal Allocation of DG Units and Network Reconfiguration from DG Owner's and DisCo's Perspectives

Ehsan kianmehr, Saman Nikkhah, Abbas Rabiee

PII:	S0960-1481(18)30982-0
DOI:	10.1016/j.renene.2018.08.032
Reference:	RENE 10459
To appear in:	*Renewable Energy*
Received Date:	20 February 2018
Accepted Date:	08 August 2018

Please cite this article as: Ehsan kianmehr, Saman Nikkhah, Abbas Rabiee, Multi-Objective Stochastic Model for Joint Optimal Allocation of DG Units and Network Reconfiguration from DG Owner's and DisCo's Perspectives, *Renewable Energy* (2018), doi: 10.1016/j.renene.2018.08.032

Multi-Objective Stochastic Model for Joint Optimal Allocation of DG Units and Network Reconfiguration from DG Owner's and DisCo's Perspectives

Ehsan kianmehr[1], Saman Nikkhah[2], Abbas Rabiee[2*]

[1]Department of Electrical Engineering, Doroud Branch, Islamic Azad University, Doroud, Iran
[2]Department of Electrical Engineering, University of Zanjan, Zanjan, Iran
Emails: Ehsan.kianmehr@iau-doroud.ac.ir, s.nikkhah@znu.ac.ir, rabiee@znu.ac.ir.
*Corresponding author

Abstract

Optimal distribution system reconfiguration (DSR) and distribution generation (DG) allocation are viable solutions for improvement of technical and economic aspects of distribution systems. This paper proposes a stochastic multi-objective DSR (SMO-DSR) model, aims to maximize the DG owner's profit and minimizes the distribution company's (DisCo's) costs. The uncertainties of wind power generation, electricity price, and demand are handled via scenario based approach. The proposed SMO-DSR model is solved via ε-constraint method and the best compromise solution is selected by fuzzy satisfying criterion. The model is a mixed integer non-linear programing (MINLP) problem which is implemented on IEEE 33-bus distribution system in General Algebraic Modeling System (GAMS) environment. To show the effectiveness of the proposed SMO-DSR approach, it is studied in different cases. A sensitivity analysis is also performed to show the effect of contract price of wind energy on the objectives of DisCo and DG owner. The obtained results substantiate the interaction between the DSR and DG allocation problems. Also, it is shown that the contract price of wind energy considerably influences both DG owner and DisCo schedules. Besides, when a compromise is made between the DG owner's profit and DisCo's cost, the power losses of the network is reduced.

Key words: Distributed generation (DG), distribution system reconfiguration (DSR), multi-objective stochastic optimization, uncertainty, Pareto optimal solutions.