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# STOCHASTIC APPROACH TO DETERMINATION OF THE DISTRIBUTED GENERATION OPTIMAL PLACEMENT


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**Authors**
**O.V. Kyrylenko, L.M. Lukianenko, I.S. Goncharenko**
Institute of Electrodynamics of the National Academy of Sciences of Ukraine,
Peremohy pr., 56, Kyiv, 03057, Ukraine,
e-mail: okjraa@gmail.com

## Abstract

*Constant growth of distributed generation in power systems has not only positive changes. Incorrect placement of distributed generation can worsen steady-state parameters of a power grid, for example, voltage profile. Method for optimal distributed generation placement had been developed previously [1, 9, 11, 17, 21]. Examination of the method shown that method had limited usage. Performance of the method greatly depended on power grid. The object of this paper was to develop a new method for optimal distributed generation placement. The object of the paper was reached in four steps: 1) optimal distributed generation placement method requirements creation; 2) development of the criteria and constraints system; 3) objective function formulation; 4) optimal distributed generation placement method development. The*

*proposed stochastic method is combined of mechanisms of evolutionary algorithms. The core idea of the new method is an evolutionary narrowing of power grid buses list, which form all the possible solutions to the problem. Thus, the buses, which form the worst solutions, are banned and do not take part in evolutionary selection of the buses. Examination of the method has been carried out on the IEEE 9-, 14-, 39- and 57-bus test systems. The results of simulation tests show that the effectiveness of the new method is high and does not depend on the properties of the studied grids.* References 22, figures 4, tables 5.

***Key words***: distributed generation, Monte-Carlo method, optimization, renewable energy sources, evolutionary algorithm.

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