USING AN EVOLUTIONARY ALGORITHM IN THE PROBLEM OF OPTIMIZATION OF THE UKRAINIAN POWER GRID

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At this time, a war is going on in Ukraine, the enemy is striking at critical infrastructure, the energy system of which is the main goal. After strikes, it is necessary to restore the power system as soon as possible, and then carry out rolling blackouts for repairs, and in these cases it is optimal to use

metaheuristics. Modern network structures are complex territorially extensive systems with a heterogeneous structure. As a result of the complexity and multidimensionality of modern network structures, which in turn are multivariate and multicriteria, and have different options when choosing solutions, the problem of justifying the optimization of network structures in the form of a general research task turns out to be very cumbersome and from a practical point of view has no solution. Given the complexity of the problem, it is advisable to consider its solution with the help of fragmentary models and evolutionary algorithms.

The developed genetic algorithm has fast convergence (about 12 iterations for a scheme of 17 nodes). Differs in high accuracy (found the solution differs from the global optimum by 8.1%. Also works correctly with various network schemes, generation and load structures. Besides, it allows you to determine the optimal network topology, the level of total loss in which is 31% lower than in the original topology. The algorithm can be used in conjunction with RES generation forecasting systems for the day ahead when planning operating modes power associations in order to minimize the costs of covering losses electricity and improve the quality of supplied electricity.

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