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Completion of Contingency Ranking Selection (N-1) Using Ant Colony Optimization Algorithm on 500 kV JAMALI System

Priyadi, Irnanda^a ; Ramli, Kalamullah^a ; Daratha, Novalio^b ; Fathoni, Evan^b ;

Gunawan, Teddy Surya^c ; Ihsanto, Eko^d

Save all to author list

^a Universitas Indonesia, Electrical Engineering Department, Depok, Indonesia

^b Universitas Bengkulu, Electrical Engineering Department, Bengkulu, Indonesia

^c International Islamic Univ. Malaysia, Electrical and Computer Eng. Dept., Gombak, Malaysia

^d Universitas Mercu Buana, Electrical Engineering Department, Jakarta, Indonesia

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Indonesia is an archipelago nation with the world's fourth-largest population. With such a large population, the demand for electricity increases proportionately. At the moment, the JAMALI interconnection system serves the majority of Indonesia's electricity consumers in Jawa, Madura, and Bali. On the other hand, improving the electric power system's safety quality is a requirement that an electric power system must meet. To ensure the power system's security, the Ant Colony Optimization (ACO) algorithm was used to run several contingency scenarios (N-1). The ACO algorithm was implemented in this study through the initial parameter initialization stages, the probability value calculation stage, and the 0/1 knapsack problem calculation stage using the maximum cost function. The test is conducted by varying the capacity of the knapsack. According to the results of the voltage performance index on the JAMALI 500 kV system, the highest value was 95.39 on line 35 connecting bus 26 (Bangil) and bus 27 (Paiton), followed by NaN on line 56 connecting the Krian and Gresik buses. While line 59, which connects bus 46 (Grati) and bus 47 (South Surabaya), has the lowest ranking with the lowest value at 95.14. © 2022 IEEE.


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ant colony optimization; Contingency ; JAMALI system; knapsack problem; voltage performance index

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