Reactive Power and Voltage Control of Offshore Wind Parks Based PI Controller tuning for STATCOM via Genetic Algorithm

Said Fouad Mohamed Mekhemar ,Ahmed Z. Hussein, Naggar Hassan Saad

Abstract

Nowadays Offshore wind parks have more attention compared with other renewable energy resources. On the other hand, transmitting the generated power from offshore to the onshore grid through high voltage alternating current (HVAC) submarine cables generates a large amount of reactive power; this problem made the transmitting of power is not complying with the grid code requirements. This paper introduces a perfect solution for solving this problem. Static synchronous compensator (STATCOM) was developed to solve these issues. To investigate the influence of STATCOM on the system, a simulation model of the system is created by MATLAB Simulink software, and the results were obtained with and without consideration of STATCOM effect. The simulation results show the operation of the system without compensation, the beneficial performance of STATCOM compensation in the system, the optimum operation of STATCOM with tuning PI controllers using genetic algorithm (GA), and the dynamic performance of STATCOM under fault. The results show the effectiveness of STATCOM on the system.

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