

Modal Analysis for Optimal Location of Doubly Fed Induction-Generator-Based Wind Farms for Reduction of Small Signal Oscillation

Authors : Meet Patel, Darshan Patel, Nilay Shah

Abstract : Excess growth of wind-based renewable energy sources is required to identify the optimal location and damping capacity of doubly fed induction-generator-based (DFIG) wind farms while it penetrates into the transmission network. In this analysis, various ratings of DFIG wind farms are penetrated into the Single Machine Infinite Bus (SMIB) at a different distance of the transmission line. On the basis of detailed examinations, a prime position is evaluated to maximize the stability of overall systems. A damping controller is designed at an optimum location to mitigate the small oscillations. The proposed model was validated using eigenvalue analysis, calculation of the participation factor, and time-domain simulation.

Keywords : DFIG, small signal stability, eigenvalues, time domain simulation

Conference Title : ICEPE 2023 : International Conference on Electrical and Power Engineering

Conference Location : Toronto, Canada

Conference Dates : September 18-19, 2023