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| **Title:** | Primary Frequency Regulation of the Hybrid Power System by Deloaded PMSG-based Offshore Wind Farm using Centralised Droop Controller | | |
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| **Abstract:** |  |
| This paper proposes a coordinated frequency control method for variable speed wind turbines with permanent magnet synchronous generators (VSWT-PMSGs) based offshore wind farm (OWF), which is connected to the main onshore grid through voltage source converter (VSC) based high voltage DC (HVDC) transmission system. The purpose of the proposed system is to damp the frequency oscillations of the onshore grid due to the installation of large-scale fixed speed wind turbines with squirrel cage induction generators (FSWT-SCIGs) based wind farm (WF) and photovoltaic (PV) power station. A novel centralised droop controller with the dead band is designed for VSWT-PMSGs to decrease the frequency fluctuations of the onshore main power system. In the proposed system, primary frequency reserve is implemented by deloading operation of VSWT-PMSGs in the OWF. The effectiveness of the proposed centralised frequency controller is verified through simulation analysis on a modified IEEE nine-bus model system in PSCAD/EMTDC software. | |