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| **Title:** | **Design and Simulation of a Dual Rotor Wind Turbine based PMSG System** | | |
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| **Published Conference Name:** | 2nd International Conference on Robotics, Electrical and Signal Processing Techniques (ICREST’21) | | |
| **Type of Publication:** | International Conference | | |
| **Volume:** |  | Issue |  |
| **Publisher:** | IEEE | | |
| **Publication Date:** | February 1, 2021 | | |
| **ISSN:** |  | | |
| **DOI:** | https://doi.org/10.1109/ICREST51555.2021.9331134 | | |
| **URL:** | https://ieeexplore.ieee.org/document/9331134 | | |
| **Other Related Info.:** | Pages 1-5 | | |
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| **Abstract:** |  |
| Conventionally, horizontal axis wind turbine (HAWT) suffers from aerodynamic incompetence in the blade root zone (adjacent the hub) due to numerous non-aerodynamic limitations. Aerodynamic interactions between turbines in a wind farm (WF) also lead to significant loss of WF efficiency. To solve this issue, in this paper, a dual rotor wind turbine (DRWT) based permanent magnet synchronous generator (PMSG) is designed in order to increase the efficiency of the WF. The DRWT consists of two sets of rotors, i.e. primary and secondary rotors. The proposed DRWT mechanism can extract more mechanical energy compared to HAWT. The overall design can be work properly during low wind speed conditions. The whole system including a detailed PMSG model is developed and analyzed in the PSCAD/EMTDC software environment. Actual wind speed data is employed to the wind turbine. Comparison studies are performed with the traditional HAWT in order to reveal the ability of the proposed DRWT based PMSG system. The simulation study shows the proficiency of the proposed DRWT based PMSG system over the traditional HAWT based PMSG system. | |