

# Performance Analysis of Grid Connected Induction Generator under Unstable Condition

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**Abstract:** Over the past few decades, there has been an increasing use of induction generator particularly in wind power applications. In generator operation, a prime mover (turbine, engine) drives the rotor above the synchronous speed. Stator flux still induces currents in the rotor, but since the opposing rotor flux is now cutting the stator coils, active current is produced in stator coils, and motor now operates as a generator, and sends power back to the electrical grid. Based on the source of reactive power induction generators can be classified into two types namely standalone generator and Grid connected induction generator. In case of standalone IGs the magnetizing flux is established by a capacitor bank connected to the machine and in case of grid connection it draws magnetizing current from the grid. This thesis explicitly deals with the study of grid connected induction generators where frequency and voltage of the machine will be dictated by the electric grid. Among these types of IGs, Doubly Fed Induction Generator (DFIG) wind turbines are nowadays increasingly used in large wind farms because of their ability to supply power at constant voltage and frequency. Modern problems with the stability due to increased risk of unstable condition of renewable sources (magnitude and phase) are studied and some of proposed systems are simulated in MATLAB- SIMULINK environment.

**Keywords:** Doubly Fed Induction Generator, renewable sources, Grid connected induction generator

## REFERENCES

- [1]. Ted K. A. Brekken, Ned Mohan "Under Unbalanced Grid Voltage Conditions Control of a Doubly Fed Induction Wind Generator" vol.no22. 1, march 2007 page129-135.
- [2]. T. Ghennam, A. Beugnie "Supervision of reactive power generation for a wind farm" Power Electronics & Application conference on 2-5 sep 2007. On page(s): 1-10 ISBN:978-9276815-10-8
- [3]. PaboloSanchis, Jesus Lopez "Control of DFIG under unsymmetrical Voltage sags" IEEE july 2008. Page(s)2466-2462.
- [4]. Enrique Escobarb, Roberto Cardenasb, Jon Clarec, Pat Wheelerc "Control strategy for a DFIG feeding an unbalanced grid or stand-alone load" Electric Power Systems (2009) 3545-364.vol.79
- [5]. Johan Morren, W.,Grant, "Ride through of Wind Turbine with Doubly-Fed Induction Generator During a Voltage Sag" IEEE transaction of energy conversion june, 2005 pages 435-4641vol.20
- [6]. Sae-Kok, Haan D.M. "Unsymmetrical Fault Diagnosis for a Doubly-Fed Induction Generator" Power Electronics and Drive System, IEEE2007. PEDS '06. 7th International Conference on 26-30 Nov. 2007 Page(s):132 -138
- [7]. F. Massaro, L. Dusonchet and E. Telaretti "Unstable Transient stability simulation model of a fixed speed wind turbine system byMatlab/Simulink"
- [8]. Marco Landi, "Measurement Techniques for Online Battery State Of Health Estimation in Vehicle to Grid Applications", IEEE Transactions on Instrumentation and Measurement, Vol. 63, No. 5, May 2014.
- [9]. Shuang Gao, K. T. Chau, Chunhua Liu, "Integrated Energy Management of Plug in Electric Vehicles in Power Grid with Renewables", IEEE Transactions on Vehicular Technology, Vol. 63, No. 7, September 2014.
- [10]. Arman Alahyari, Mahmud Fotuhi-Firuzabad, "Incorporating Customer Reliability Cost in Pev Charge Scheduling Schemes Considering Vehicle To Home Capability", IEEE Transactions on Vehicular

Technology, Vol. 64, No. 7, July 2015.

- [11]. Adrian Florescu, AntonetaIuliana Bratcu, “Lqg Optimal Control Applied to on Board Energy Management System of All Electric Vehicles”,IEEE Transactions on Control Systems Technology, Vol. 23, No. 4, July 2015.
- [12]. Corey D. White, K. Max Zhang, “Using Vehicle to Grid Technology For Frequency Regulation and Peak Load Reduction”,Journal of Power Sources 196 (2011) 3972–3980
- [13]. Albert G. Boulanger, Andrew C. Chu, Suzanne Maxx, and David L. Waltz, “Vehicle Electrification: Status And Issues”, Proceedings of The IEEE , Vol. 99, No. 6, June 2011
- [14]. Kristien Clement-Nyns, Edwin Haesen, “The Impact of Charging Plug-In Hybrid Electric Vehicles on a Residential Distribution Grid”, IEEE Transactions on Power Systems, Vol. 25, No. 1, February 2010.
- [15]. Ahmed Yousuf Saber, “One Million Plug-In Electric Vehicles on the Road By 2015”,Proceedings of The 12th International IEEE Conference on Intelligent Transportation Systems, St. Louis, Mo, Usa, October 3-7, 2009.
- [16]. Santosh kumar, “Modeling and Architectural Frame Work of Off-Board V2g Integrator for Smart Grid”,International Journal of Renewable Energy Research, Vol.4, No.4, 2014.