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Title: Power Control of Doubly Fed Induction Generator (DFIG) Based on IP Controller

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Published Journal Name: Journal of Power Electronics & Power Systems

Type of Publication: Journal

Volume: 6 Issue 3

Publisher: STM Journals

Publication Date: 2016

ISSN: 2321-4244

URL: <https://www.stmjournals.com/index.php?journal=JoPEPS&page=article&op=view&path%5B%5D=7888>

Other Related Info.: Pages 23-32

Citation: A.K.M Rejwanul Haque, Mohammad Abdul Mannan, Junji Tamura, “Power Control of Doubly Fed Induction Generator (DFIG) Based on IP Controller”, Journal of Power Electronics and Power Systems (STM Journals), Vol. 6, Issue 3, pp. 23-32, 2016.



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Abstract:

Conventionally, the indirect power control of Doubly Fed Induction Generator (DFIG) has been developed based on conventional Proportional-Plus-Integral (PI) controller due to its simple construction and implementation. The steady-state error minimization, overshoot elimination and disturbance rejection are not possible where the gains of PI controller are chosen by trial and error method. The steady-state error and disturbance rejection can be possible if the gains of PI controller are chosen by proper choosing of poles. But the overshoot elimination is not possible where PI based control is designed. In this paper, Integral-Plus-Proportional (IP) controller is proposed to design for power control of the DFIG. The IP controller is well suited to minimized the overshoot problem which is arisen in PI controller. The performance of proposed IP controller for power control of the DFIG system is analyzed and investigated through the simulation work. The results of simulation works are presented to demonstrate the effectiveness of propose IP controller compared with conventional PI controller. The proposed IP controller shows the superior performance over PI controller in terms of minimization of overshoot.

Keywords: Stator flux orientation control, Active and reactive power control, PI controller, IP controller, Doubly fed induction generator