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# THE FINITE SET MODEL PREDICTIVE CONTROL OF DOUBLY FED INDUCTION GENERATOR SUBJECTED TO UNBALANCED GRID VOLTAGE DEFECTS

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## ABSTRACT

*This paper proposes a finite set model predictive control of doubly fed induction generator under unbalanced grid voltage conditions. The generation of sufficient power which equals the load demand and grid voltage stability is the major concerns that are to be addressed during the last decade. When the high capacity wind power generation is synchronized with the power grid, several problems in the dynamic behaviour of the power system are raised. During grid faults the transients are observed in the power system; when transients, occur the low voltage ride through is the major concern for the wind turbine to be in stable state. During this period the wind turbines inject harsh distorted currents in to the power system due to the unbalanced grid voltage conditions. The doubly fed induction generators are most commonly used in the wind turbine due to the presence of low voltage ride through (LVRT) and high voltage ride through (HVRT) capabilities. This paper provides a complete study on the LVRT and HVRT capabilities of DFIG based wind turbines. It also analyses dynamic behaviour and transient characteristics of DFIG during symmetrical and asymmetrical grid voltage swell and dip conditions. The effectiveness of the theoretical analysis is verified by using MATLAB/Simulink.*

**KEYWORDS:** *DFIG, Grid Voltage Failure, LVRT Control, Wind Power Generation*