Load Voltage and Frequency Regulation in PMSG based Standalone Wind Energy Conversion System

Abstract

Stand alone variable speed wind energy conversion system with PMSG is proposed in this paper. Two back to back VSCs are connected to interface PMSG with load. Constant voltage in DC link between two VSCs can be maintained constant by using a battery energy storage system (BESS). BESS is efficient to maintain load voltage and frequency to be regulated during variable wind speed conditions. MPPT based vector controlling is used to control generator side converter to maintain unity power factor at PMSG which improves generated power and efficiency. Load side converter is controlled to maintain regulated voltage and frequency at load side. Simulations are performed using MATLAB/SIMULINK to check effectiveness of control strategies. Performance is checked with increase in wind speed; decrease in wind speed and with unbalanced/non linear loads.

References

1. Liuchen Chang, “Wind Energy Conversion Systems” University of N. Brunswick, NB,
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Index Terms

Computer Science

Signal Processing

Keywords

PMSG, wind energy, MPPT, Battery Energy storage, voltage source converters.