





## 6. Simulation Results

The generator design functionality is confirmed using a wind power generator framework simulation model with an excitation synchronous generator and its corresponding sub-systems, using MATLAB/Simulink and MATLAB/Simpower software. Sub-systems include the wind power input, servo motor phase tracking control, maximum power tracking control, excitation synchronous generator, and grid connection. respectively. To output the three-phase voltage signals at 60 Hz, the excitation synchronous generator must operate at 1800 rpm with 4-pole windings.

The voltage phase tracking performance of the system at generator output 2 kW is investigated. Fig. 10(a) shows the phase voltage and current waveforms of the excitation synchronous generator. Fig. 10(b) shows the grid and generator voltage phase tracking waveforms. The simulation voltage and current waveforms in Fig. confirm that the proposed system has high-quality power and sufficient control stability during grid connection. The generator output phase voltage is in phase with the grid in Fig. Owing to the excitation synchronous generator rotation speed control and excitation control, the output power, voltage, and frequency are constant. The wind power generator system can thus connect directly to the grid

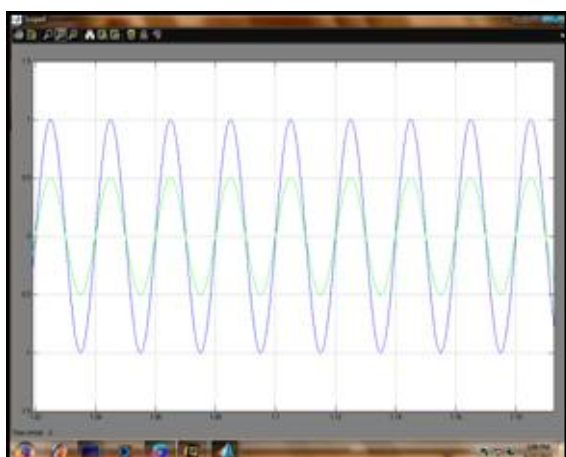


Figure : Vsg And Isg Of Phase A

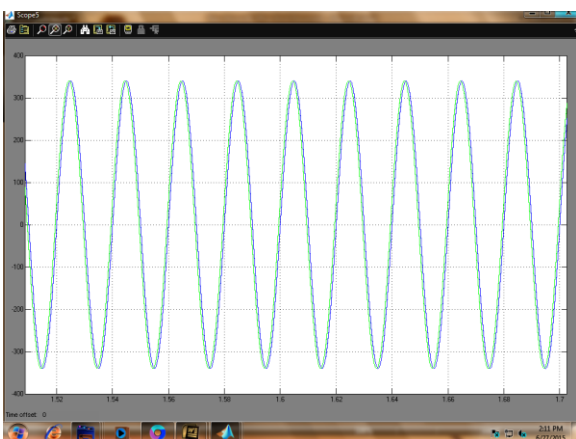


Figure : Grid Voltage And Inverter Voltage

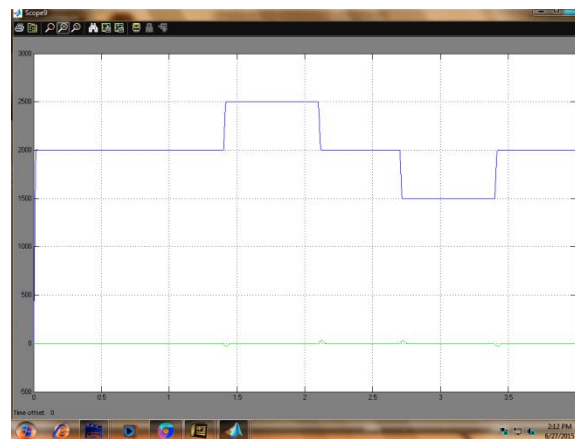


Figure : wind Power and torque of generator

## 7. Conclusion

This paper presented an excitation synchronous wind power generator with MPTC scheme. In the proposed framework, the servo motor provides controllable power to regulate the rotor speed and voltage phase under wind disturbance. Using a phase tracking control strategy, the proposed system can achieve smaller voltage phase deviations in the excitation synchronous generator. In addition, the maximum output power tracking scheme governs the input and output powers to achieve high performance. The excitation synchronous generator and control function models were designed from the physical perspective to examine the presented functions in the proposed framework. Experimental results demonstrate that the proposed wind power generator system achieves high performance power generation with salient power quality.

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