

# A Novel Doubly-fed Induction Wind Generator Control Scheme for Reactive Power Control and Torque Pulsation Compensation Under Unbalanced Grid Voltage Conditions

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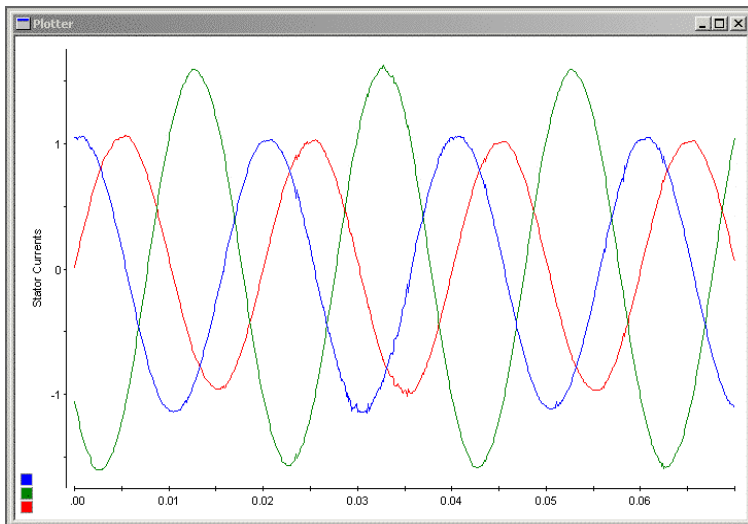
## **Funded by the National Science Foundation**

This project aims to develop a control scheme for a doubly-fed induction wind generator that:

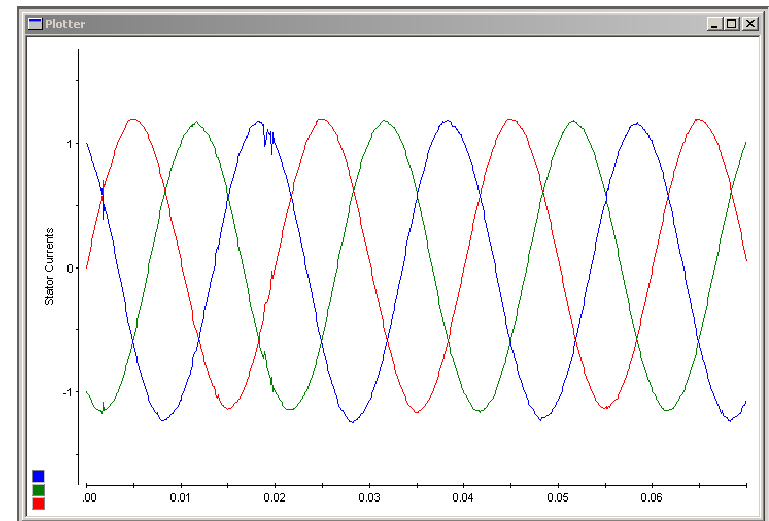
- 1) Offers speed and reactive power control.
- 2) Compensates for torque pulsations, allowing the wind generator to stay connect to an unbalanced grid.
- 3) Draws 3-phase balanced current from the unbalanced grid.

# Results

Experimental results on 200 Watt lab setup: injection of negative sequence rotor currents to compensate for stator current unbalance.



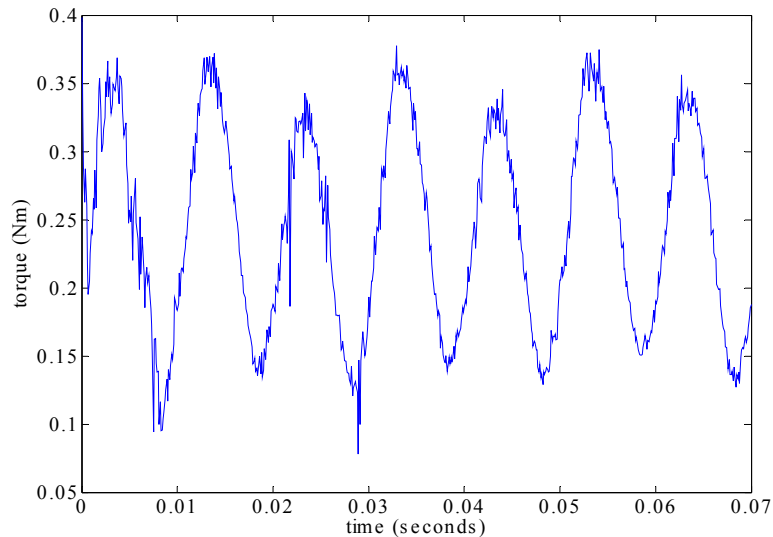
Stator current with 50% stator voltage unbalance, no rotor compensation



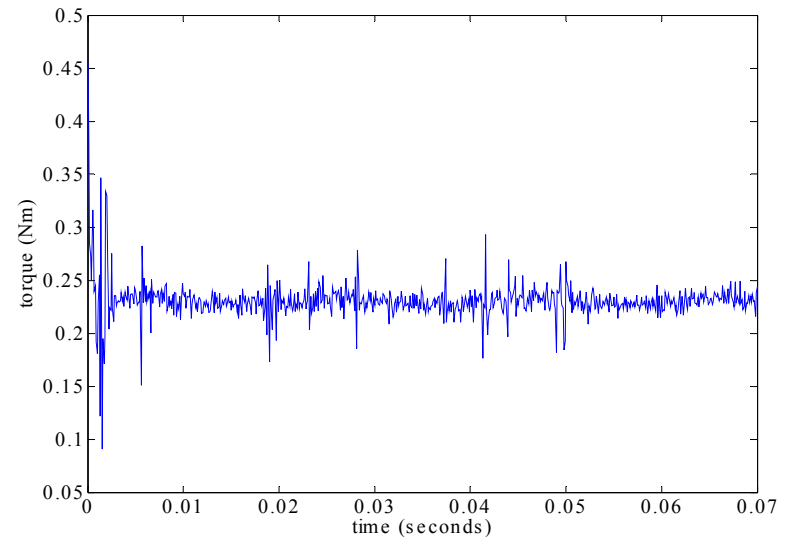
Stator current with 50% stator voltage unbalance, with rotor compensation

# Results

Experimental results on 200 Watt lab setup: injection of negative sequence rotor currents to compensate for torque pulsations.



Electromechanical torque with 50% stator voltage unbalance, no rotor compensation



Electromechanical torque with 50% stator voltage unbalance, with rotor compensation

# Future Work

- ◆ Controller design of rotor converter for reactive power control and balancing stator currents
- ◆ Investigation of FPGA's for modeling and control
- ◆ Hardware testing

# Publications

- ◆ T.Brekken, N.Mohan. "A Novel Doubly-fed Induction Wind Generator Control Scheme for Reactive Power Control and Torque Pulsation Compensation Under Unbalanced Grid Voltage Conditions." Power Electronics Specialists Conference, 2003.