Doubly Fed Induction Generator Simulation and Control

Team Power Team

The Project:

Simulate a doubly fed induction generator (DFIG) in real time.

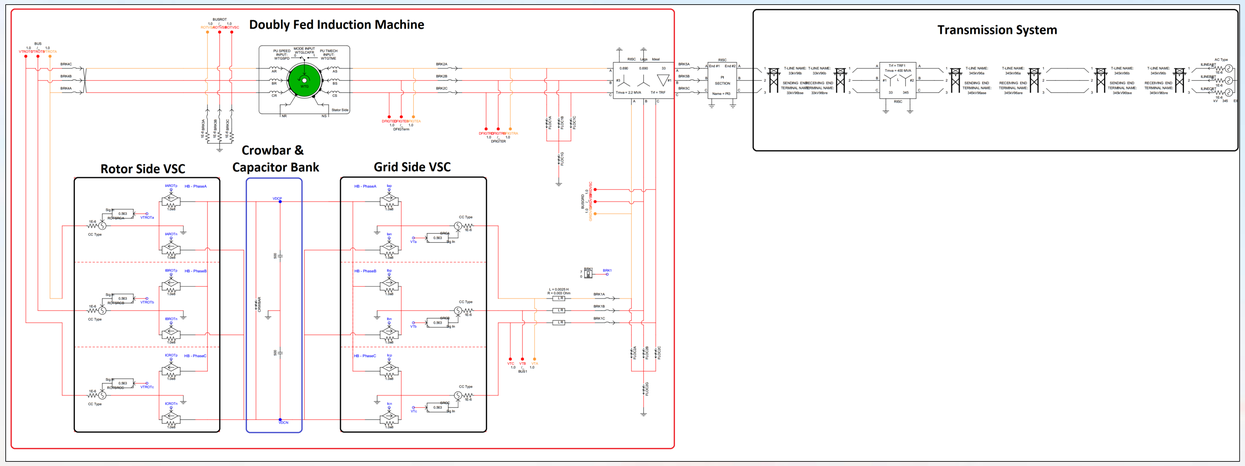
The Goals:

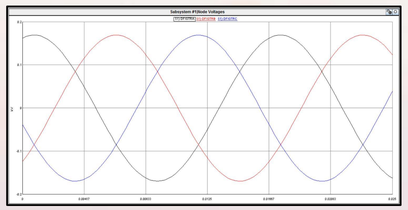
Implement and test two real time simulator cases of Type III wind turbines interfaced to power systems

- -690VAC
- -208VAC

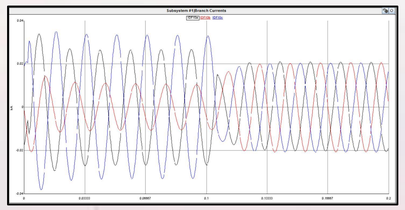
Implement and test controls in wound rotor induction motor testbed and connect to the AMPS

Software



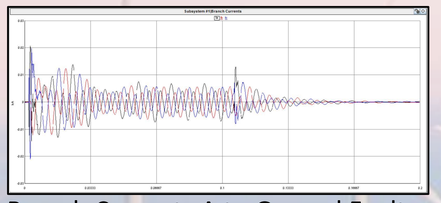


Terminal Voltage Normal Operation

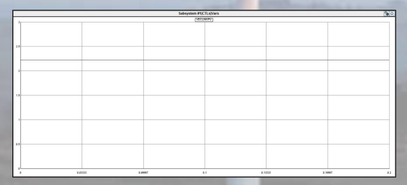


DFIG Current A to Ground Fault

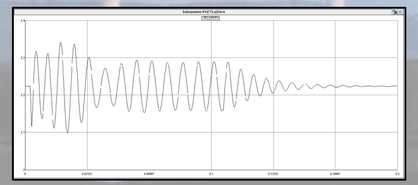
DFIG Current Normal Operation



Branch Currents A to Ground Fault



Vdc Link Normal Operation



Zoomed Vdc Link A to Ground Fault

Test:

Both DFIG system models were successfully constructed and simulated using RSCAD software on a real time digital simulator (RTDS)

The Future:

Hardware control scheme programmed and tested

Physical DFIG to be tested and compared against software model

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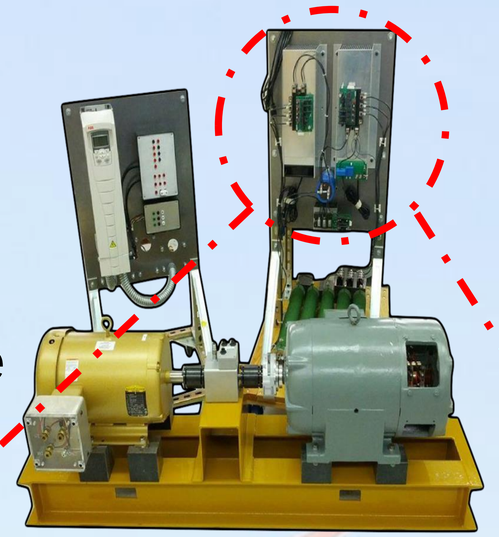
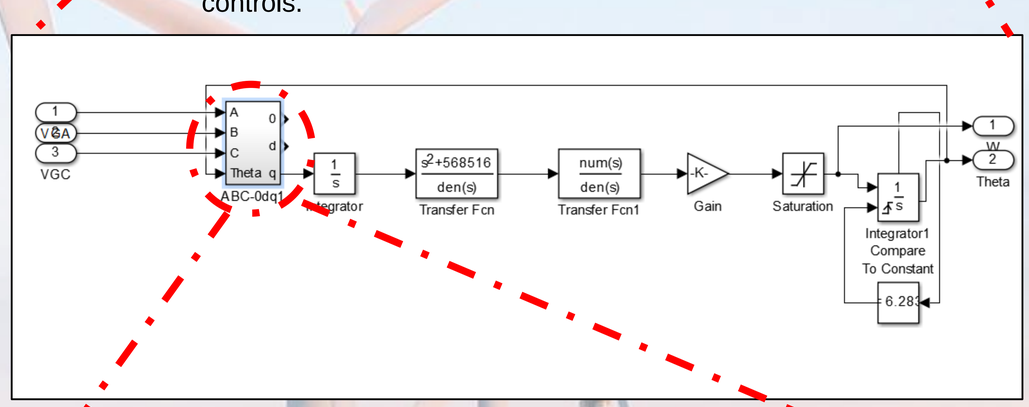
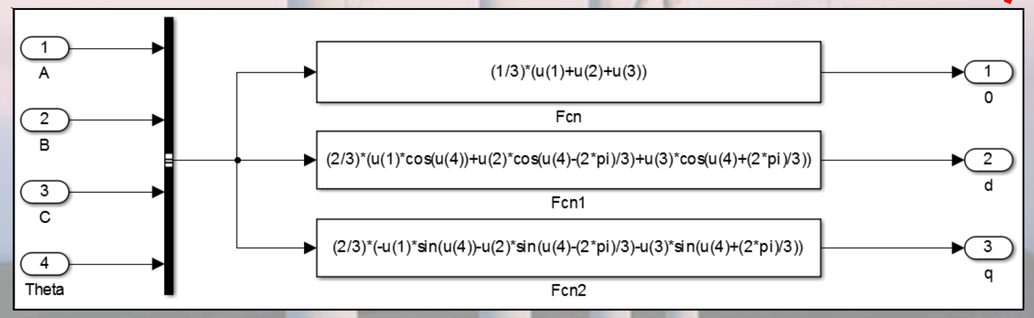
Hardware



A Simulink model was used as a basis to program a pic24 microcontroller. Incoming signals are converted to DQ or αβ synchronous reference frames before being sent to further controls.



Phased Lock Loop Microcontroller Logic



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