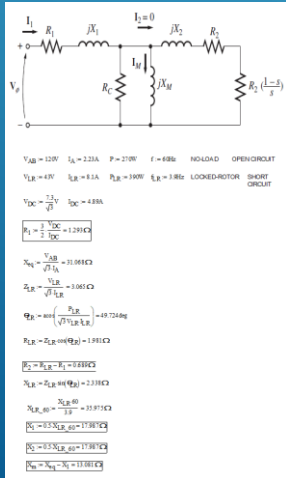


Project Goal

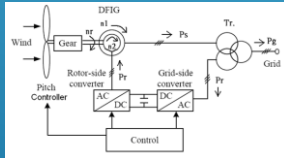
Main goal of the project is to build a motor generator system that mimics a wind energy system, which is based on a Type-III DFIG

We want to design a controller for the rotor side that will enable the machine to turn at a very low frequency, but generate at 60 Hz using a variable speed drive system

Project learning



Model parameter

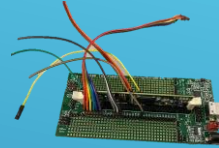


AC excitation variable frequency
constant frequency operation
principle of DFIG

In the first semester, our team put most efforts in learning the doubly fed induction generator and determine its parameters by doing Locked-rotor test, No-load test and DC test.



Power converter with voltage and current sensor



Microcontroller



Gate driver delay circuit



Driver board

We looked at several previous projects of graduate students and senior design teams from the past, and decided to design a controller system with several boards performing different tasks in order to simplify the design process and connect them using fiber-optics to reduce noise.

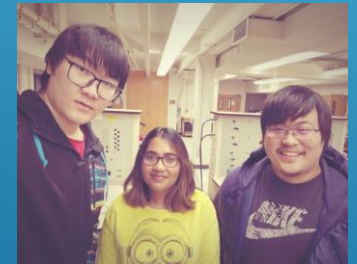
We reverse engineered some of the gate driver boards and drew the circuit layout, since we don't have enough time to finish the design, we are going to organize the materials we have and pass them to the next senior design teams to finish this project.

In order to design the PID controller for the DFIG we needed to learn about PID control and how to implement it using Simulink and matlab code that can be easily converted into any other language code that can work with the microcontroller chosen in the future.

To break it down and make it simpler we started with a simple RL circuit and are now working on an existing induction machine simulink model which can be used in the future to model a DFIG.

CONCLUSION:

Main goal of the project was to model a wind-energy system that uses a type -3 DFIG and in the given time we learned about the machine, conducted tests to calculate the parameters of the machine used, tested existing hardware and implemented simulink model for an induction machine.



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