



DOUBLY FED INDUCTION GENERATOR(DFIG)

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OVERVIEW

Introduction:

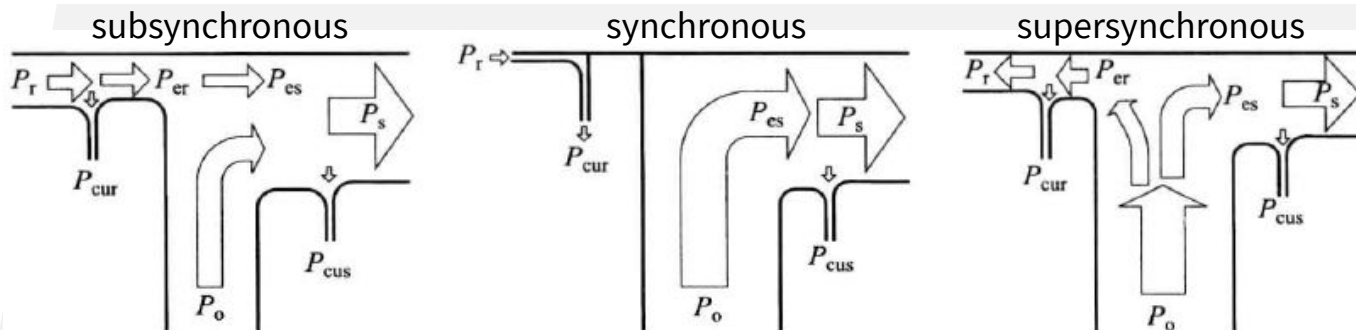
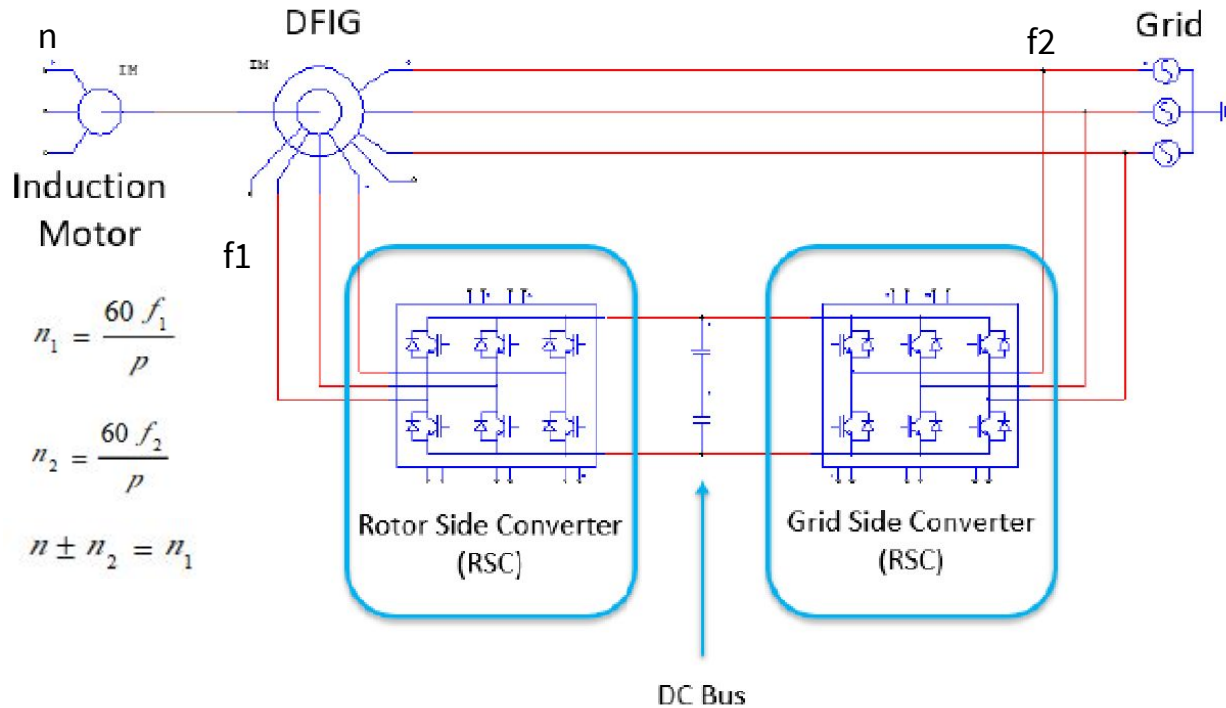
The project is to build a motor generator system that mimics a Type-III wind turbine, which based on DFIG

Goal:

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

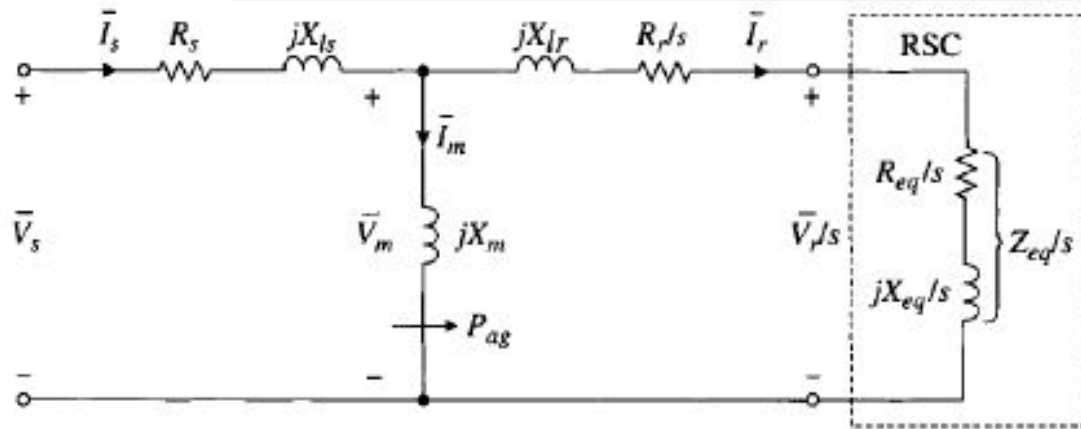


ABOUT DFIG





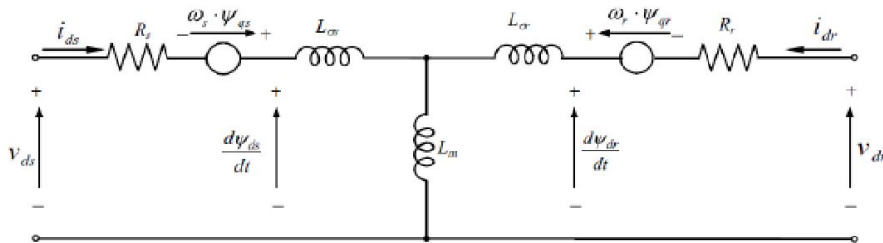
MODELING



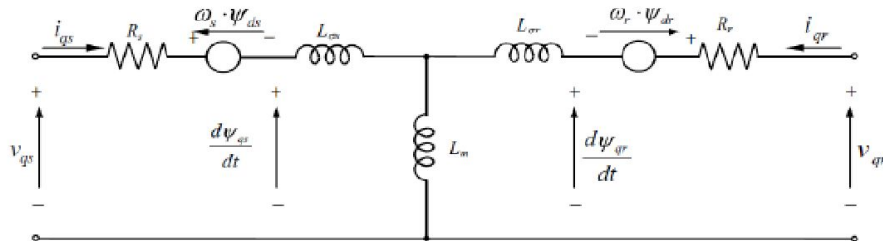
Steady-state operation

For analyzing power relations

d-axis:



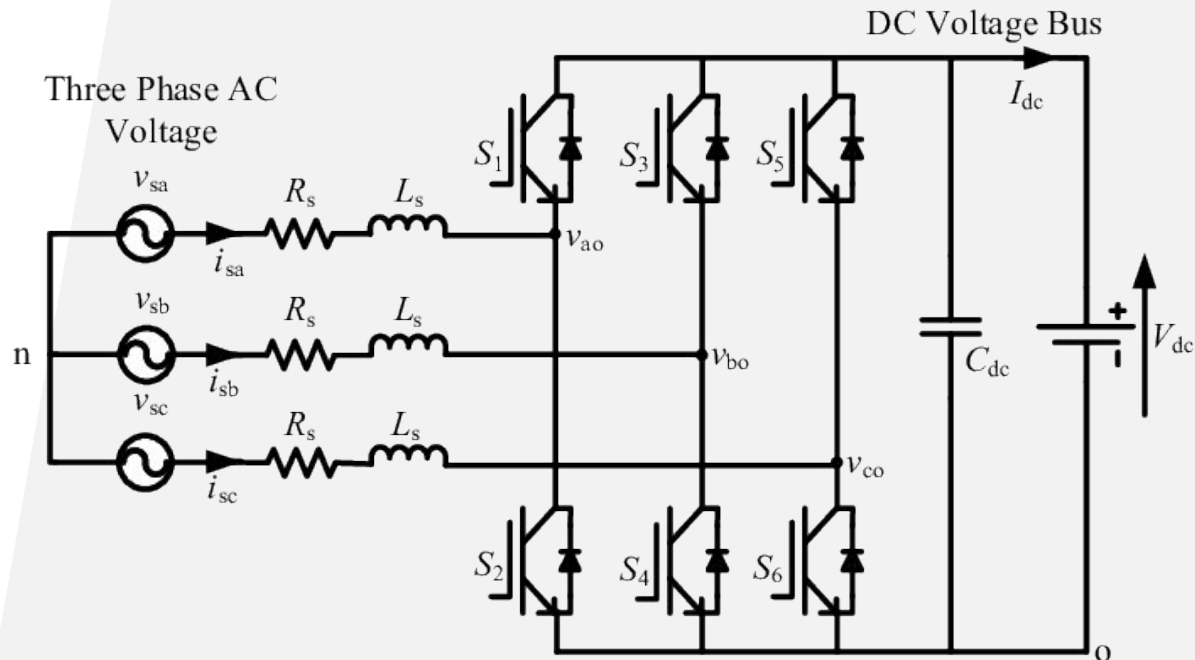
q-axis:



Dynamic operation.

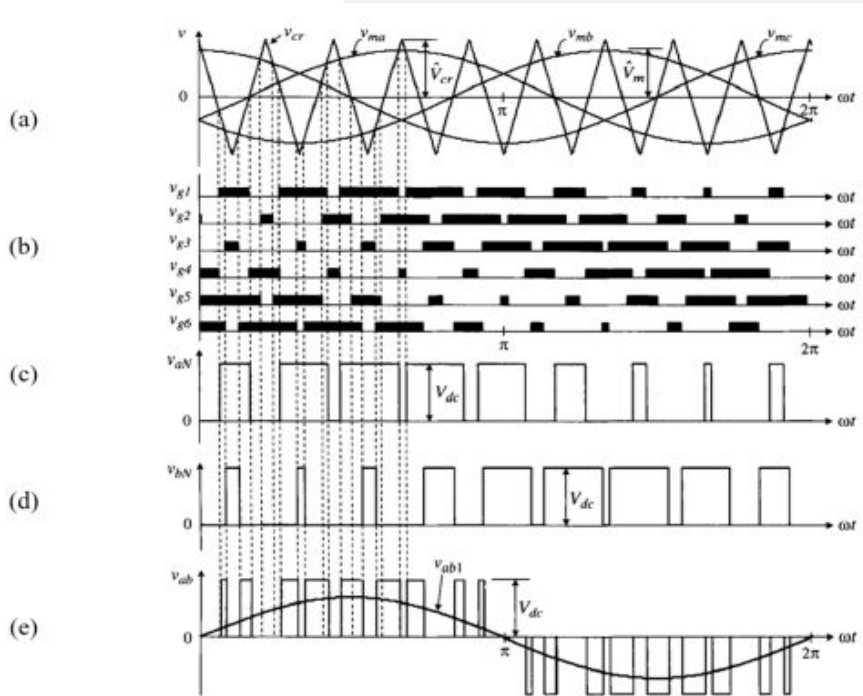
For developing machine control scheme

ROTOR SIDE CONVERTER



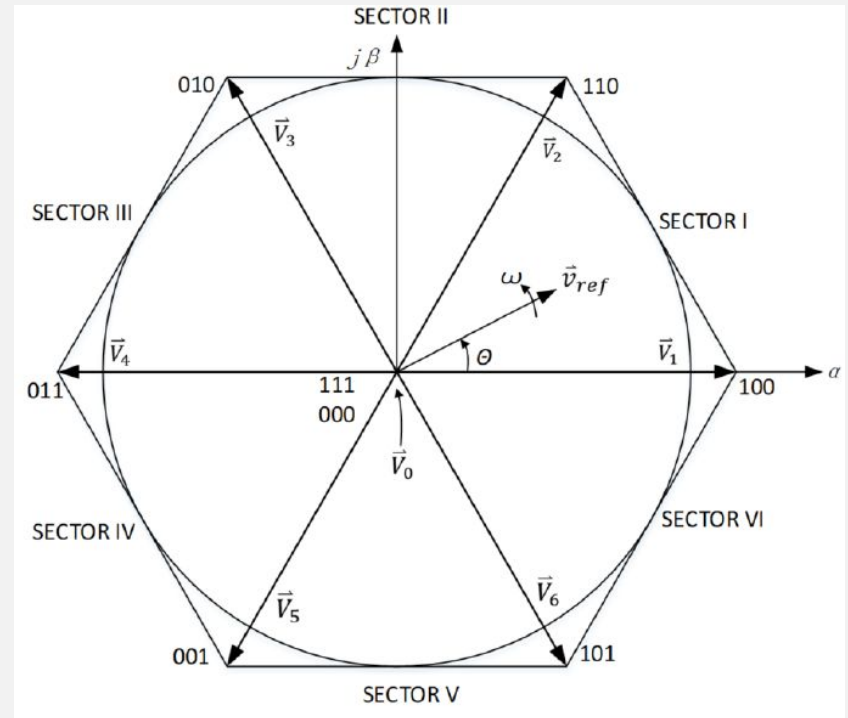
- AC-DC half-bridge converter
- Control the rotor field current frequency

SPWM vs. SVPWM



Sinusoidal Pulse Width Modulation (SPWM)

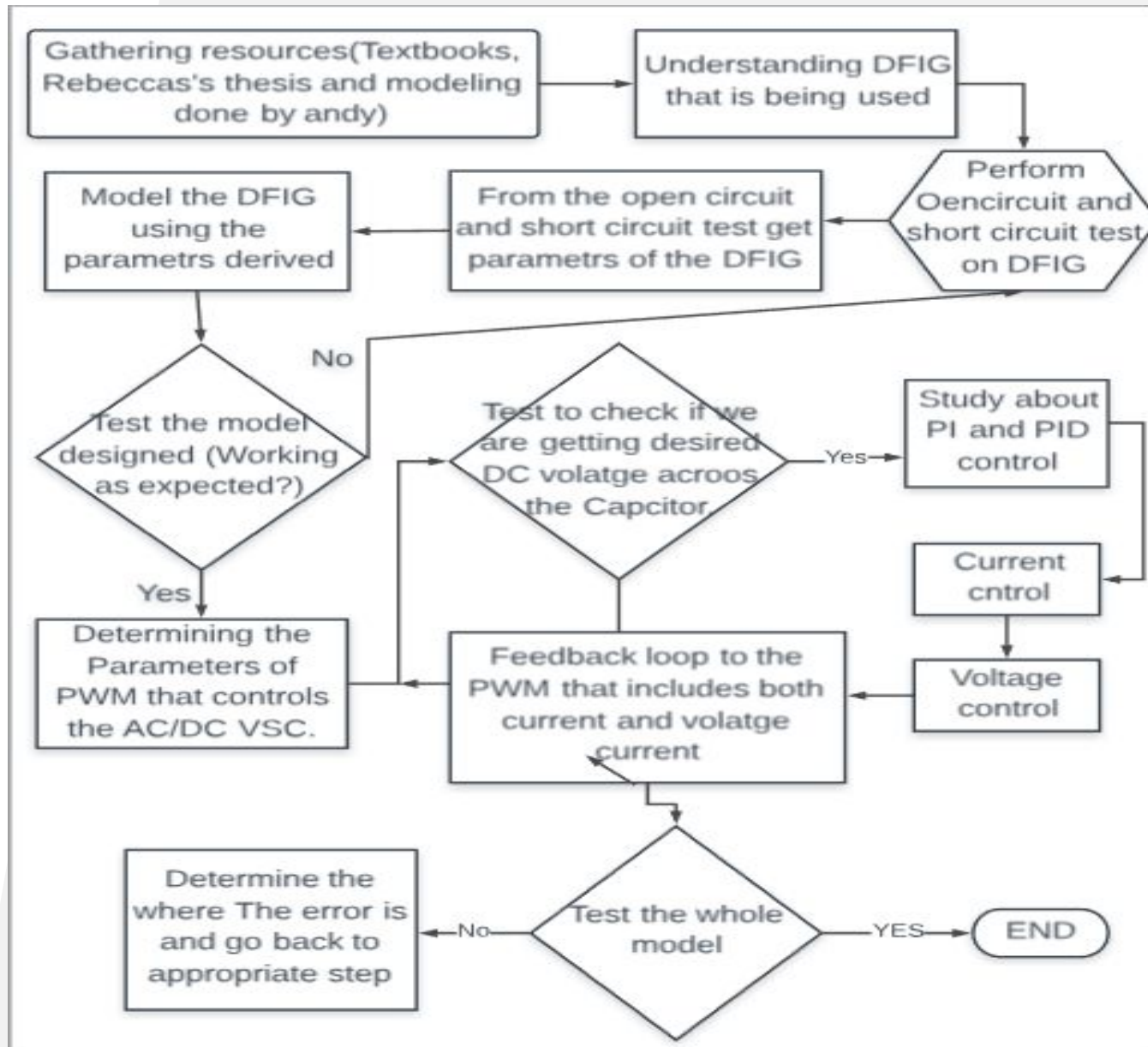
Easier to implement



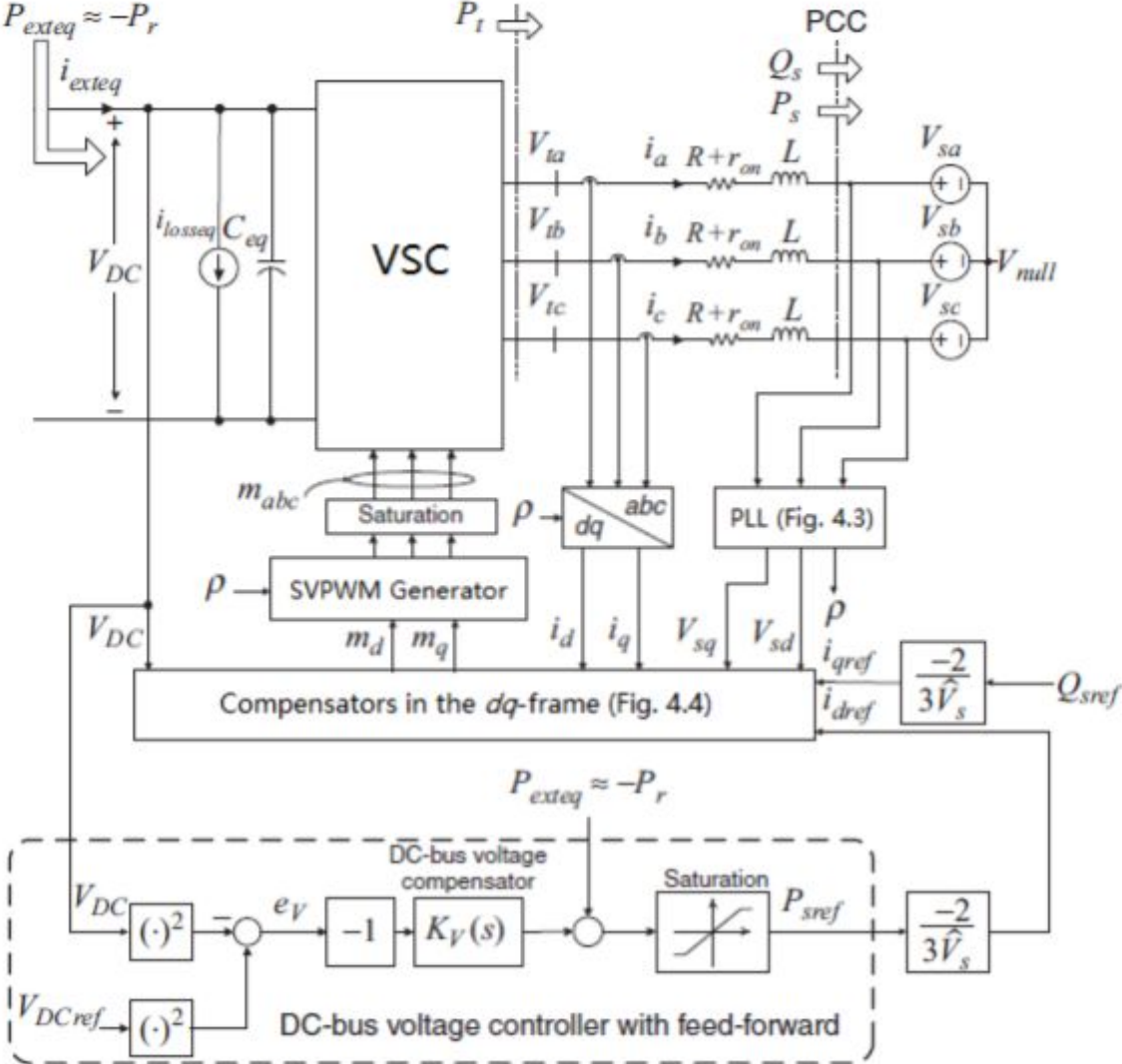
Space-Vector Diagram

- Reduces switching harmonics and switching loss
- Higher peak output voltage

CPM CHART



CONTROL OVERVIEW



Schematic Diagram of a Current-controlled Real/Reactive Power Controller with a Controlled DC-Voltage Power Port in dq-frame



CONCLUSION

Final goal of the project is to successfully model and design appropriate control system required to achieve constant DC voltage across the Capacitor used even at low frequencies which can be challenging with variable low frequency