
DFIG MINUTES

2--9/23/2014

Discussed within meeting

- Turned in Team Contract
- Discussed Team roles and items within contract
- Talked about RSCAD and time availabilities
- Got g-mail information
- Got Binder for portfolio
- Went over problem definition
 - Mike's model, might be December when we can get his model
 - We need to get a game plan for how to simulate it
 - **LEARN SOFTWARE
 - We can start modeling items that he has already completed
 - Will be careful about what to simulate as to avoid redundancies

Thoughts to Ponder

- Develop methodology on how to verify model
- What looks good and what looks bad

DFIG MINUTES

#3---9/30/2014

Discussed within meeting

- Turned in Transcript of client interview
- Update on conference (tiras will be here)
 - Need specs for Friday
- Spend more time on RSCAD this week
- Need to update personal log books
- Need to update portfolio
 - Grad-Students models are talking a bit longer

Thoughts to Ponder

- Develop methodology on how to verify model
- What looks good and what looks bad
- Take a part of the DFIG so the team knows what the inner workings are
 - SNAPSHOT – what we are doing, and how we are planning to achieve it.
- UNDERSTAND WHAT WE HAVE TODAY IN PROTECTION FOR DFIG
 - Main faults
 - What are they doing to take care of it
 - Improvement on it

Items to address

- Need client specs – talk to Dr. Hess
 - Design review, design the test and how it will be tested
 - January, how we did the test – for building basically.
 - We will build what is necessary for design to protect it. How far it extends into the grid is up to us. Must cover subject.
- Portfolio
- Team Picture
 - Pictures of tutorials
 - TEAM MEETING 4:00-6:00 to work on tutorials
- CONTACTS with SEL

Ideas from Dr. Hess

- Model of the machine
- Method of protection (1 scheme for some kind of fault)
- Run them by him – refine issues – generator protection people at SEL
 - What levels of current
 - What levels of time
 - What faults
 - Set it up with numbers associated
- Run it by Normand before design review. Use his time wisely
- Is the model verification more, or method of protection more
- If using model, verify it to verify it can do what we want it to do. Be confident that it works, then design a protection scheme. Normand might give us more direction later on.
- As we define what we want to do. Write the specs, we know what machine specs are, now we can define what faults, talk to SEL as to what faults they deal with.
- CONTACTS AT SEL FOR FAULTS/GENERATION, Mike Beachum might be able to introduce us to Spencer Goodall, Hang Li, both have been working at SEL, might know who to ask to find the right person.
 - Send email to find someone
 - Design – people part – finished product
- Can use SEL equipment, might need to modify
 - Dr. Johnson or Normand can possibly get it,
 - Don't have to reinvent what is in a blue box, EXTEND not Redesign
- Find out what is happening to machine, feeding machine?
 - DFIG might supply fault, everything keeps going, control system is priority.
- Might need to learn symmetrical equipment, negative sequence, you can pick up faults
- Zero sequence, compare with other designs
- Invent a component that finds fault
- Take the 3 phases coming out of machine – compare stator 3ph and rotor 3ph and add/multiply/over time to pick up on fault,
- Needs to reject tripping for other common faults

DFIG MINUTES

#4---10/7/2014

Discussed within meeting

- Snapshot – tiras will be presenting
 - Everyone else will work hard and help put the poster together
- Building up research material on DFIG (SEL has already done some) we printed it out to have
- Meeting time again 4:00-6:00 Thursday
- Wiki today
- Bring a copy of the SEL research to the snapshot day to show there is an interest in the DFIG
- We will need to get more contacts at SEL**

Thoughts to Ponder

- TALK TO THE SEL PEOPLE AT CONFERENCE
 - If its HR people, still talk to them
- **Write** Questions down and send to Norman before meeting, so that we can make an interaction and get a feel for what is going on.
- Someone Tim Lenberg– Tim had Mike. B's job this year. Everything Tim did Dr. Hess has a copy of that.
 - Talk to Tim about questions about m
- **IF** we get stuck, check the alumni assc. Great contacts
- **Design Review**
 - Need a design (brief) SOON
- **Lenberg, Tim** lenb1914@vandals.uidaho.edu
- **Thursday 4:00 10/16/2014 Debreif**
 - **Scheduling across panorama room**
 - **If we don't show up during the time Budget: #FD7001**

Items to address

- Get contacts at SEL
- Snapshot Poster
- Tiras has already created a wiki page before
- **WPRC** – Get Questions written down for the conference.
- **Conference** – get into session – see who session **chairmen** is, walk up and present the question and who we should talk to. He'll know who talk to. – Work is done in the hallways.
- Hospitality Suites – they know where the jobs are*** FOOD

Snapshot day

- Specs Matrix – make nice
- Nice Description
- Take picture of Dr. Hess's poster to get an idea

Appendix

Table 1. Expectations for snapshot day 1 at UI

- | |
|---|
| <ul style="list-style-type: none">• Portfolios should be updated to include a synthesis of your project learning and all other midpoint of first semester deliverables• Bring any existing hardware/software, pictures from client interviews, diagrams, catalogs, etc.• Make 8.5x11 printouts to create a poster that includes:<ul style="list-style-type: none">○ Team name, team members, sponsor○ Problem statement○ Documentation of project learning such as models, synthesis of notes on the people, products, technology relevant to the project○ List of needs/specs/requirements○ Any concept development to date○ Display a plan for project completion (milestones & dates) |
|---|

DFIG MINUTES

#5---10/16/2014

Discussed within meeting

- Larry Elliot Relay Application Innovation, Inc
 - Good contact – rebuilt the power lab
- Juliet Peterson from power engineers
 - Willing to help but need to email her **soon**
- Information session,
- Progress on the project
 - Preliminary scheme
 - How to make it work
 - 310 or 510 relay from SEL, downstairs?
 - If not SEL might donate
- How will we figure out if it is good
 - Ground testing
 - Differential
- Dr. Hess will meet with Mike and Normann about model
- Tim Lindburg's work on Dr. Hess's office
- Get grid work from Dr. Johnson

Thoughts to Ponder

- Find out what technology is out there – more
 - How it's used and why
- Use some communication elsewhere for faults on DFIG
 - Motor generator set finished
 - Go down line – detect on other side of fault – current reverses going back into fault – take to advantage or not? Ask Johnson
 - Get some information if it's a reasonable and worthwhile for design review
 - 1 or 2 ideas by design review

Items to address

- Feasible scheme in 3 weeks
 - RUN IT BY JOHNSON
 - Have it organized
 - Holes?
- Start on a method by design review
 - DFIG don't give a lot of sign in faults
 - Under excitation so we can't see if its above rated
 - Don't detect during normal operating
- Update specs, need refinement
- Looking at when we want to do the design review
 - Near the end of the – need fast
 - Dr. Li, Normann, Dr. Johnson, Dr. Hess, Larry Elliot, skype Julia Peterson?

DFIG MINUTES

#6---10/21/2014

Discussed within meeting

- Greg – RM 101 technician functions
- Mike should have it running within a week
- Unify rahichb's model with the new model for fault analysis
 - Machine is operating as a current source
 - All things in SEL are operating as voltage sources
 - Question becomes how to protect a current source
 - Volt (open it)
 - To protect a current source (you short it to somewhere else)
 - Controls – and behavior of faults – to see if it behaves as a current source
 - Figure out – current source inverters (old) – worked well for high loads. Rock crushers – cement – high current source – large inductor.
 - Use on ships – how do they protect it???
 - Assistance with building
 - Check with him to see if torque sensor is calibrated
 - Part stock for special items?
- Field oriented – torque control for AC machines
 - A lot of programming
 - Control algorithms – future grad student
 - Ask Normann about control algorithm – performance – related to protection
 - Current based?
 - Have a fault – normally expect gen to dump generator to dump energy
 - Set up for type 3 to keep current smooth
 - Voltage goes weird
 - What is making controls stabilize current
 - Propriety – putting certain amount of energy in – control puts same out
 - Control can sense current out – immediately backs off
 - Watch what current out
 - Detect it, but don't want to detect noise.
 - Voltage may collapse on the other hand
 - No load – no resistance – low voltage (on one phase?)
 - Probably no access to control side of it

- May need to help mike with the modeling and the DFIG
- Tiras sent email to Chris Dyer
 - See what he knows from power engineers
 - Will send email to Larry Elliot
- If we have a problem with scheduling RTDS – talk to Dr. Johnson about getting time on machine.
- **Get** appointment with
 - Ideas – ideas for protections
 - **Dr. Johnson – controls and systems**
 - **Dr. Law – machines and converters**
 - config – 4:30pm double for Fridays**

Thoughts to Ponder

- Look into voltage collapse
 - Controls are backing off on current
 - Voltage may change
 - Internal generated voltage may change as well.
 - Other control algorithms
 - Negative sequence – becomes as big as the positive sequence – ect
 - Voltage a – ground to ground in a reliable way can be a problem
 - Faults start off inductive or capacitive can turn into resistive
 - Talk to Dr. Johnson about control algorithms – he may know a good bit
 - Current source inverters – How do they use it on a boat and protect
 - All power systems modeled as a VS behind the item.
 - Inductor – open – extinguish arc – safe!
 - Open Is not a safe condition – not easy to get to.
 - Might need to move away from SEL general practice – current not voltage.
 - Current has to go somewhere
 - Generator as a current source – line as a voltage source
 - 2 breakers – short current source first – open voltage source
 - How do we detect the fault

Items to address

- Look at what is needed at the end of the semester
 - If we need any parts – order during Christmas for buffer time
 - Product from SEL?
- Get appointments with
 - Dr. Johnson
 - Dr. Law

- Get appointment for design review.
 - Sooner than later
 - Invite everyone
- Finish up wiki-page

DFIG MINUTES

#7---10/28/2014

Discussed within meeting

- Talked about meeting times for design review
 - Get times for li, Hess, Johnson first then email Normann for times
- Got emails from power engineers
- Talked to Dr. Hess
 - 2 crowbar systems to isolate and disconnect
 - Lot of information on protecting the fault

Thoughts to Ponder

- Come up with a protection scheme for a deliverable
 - Detecting fault is the hard part*
 - Once RTDS model, we can simulate and see what happens
 - Waiting for model from mike
- Current detection line to ground is difficult on DFIG
- We need a new scenario
 - Differential line current detectors between lines

Items to address

- New type of fault
- Get meeting time for Design review
 - How we are going to detect in early stages
 - Couple of ideas
 - If he likes it, good, if not, find another
 - Looking at basic protection scheme

DFIG MINUTES

#8---11/04/2014

Discussed within meeting

- Need to update wiki page
 - Need to include team information on top right
 - Mentor – advisor
- Meeting times for
- Talked to Dr. Hess about new project view
 - Figuring out fault from DFIG because it is a weak source
- Views from Dr. Johnson
- What to expect at design review
 - Defining problem
 - Specs
 - Assumptions
 - What we are going to do and where will we go?
 - Present ideas
 - Model of machine
 - System to use
 - Expect how they will react
 - Whatever we plan to do **next** to continue on to get a solution
 - Machine operation
 - Normann

Thoughts to Ponder

- 411 likes current, what do we do that is any different.
 - If I-G it may or may not pick up voltage down the line
 - Wants current transformer to get current
 - Generalized alpha plane
 - Bases items on hysteresis level on acceptable current going in and out.
- Need an idea how to drive the motor for the model power grid
- No infinite bus. Different model.
- Get the data and digitize and put into Matlab to simulate what might show up.
 - Indicators are in the control software

Items to address

- Send out emails to get meeting time to **Normann Fischer**
- Coordinate with Dr. Johnson to move the motor?
 - Short terminals
 - Open circuit, don't run at residual speed, run at no load
 - Get assumptions for leakage reactance
 - DC supply for ratio of voltage and current for resistance. And turn ratio

DFIG MINUTES

#8---11/04/2014

Discussed within meeting

- Got Logbooks back, were not graded so we will need to turn back in
- Wiki page review
 - Need a brief description on the top
 - Replace SEL picture with a different one
 - Shorten up background
 - Motivations for this project?
 - Separate discipline on team members
 - Meeting minutes and agenda is fine
 - Look at other wiki- pages for design review
- DFIG Test Today
 - Beware of a tangent in characterization guide
 - **Contact Alex in 102**
- T-line update
 - Chris dyer might have a model
 - Dr. Hess can sign a non-disclosure agreement
 - Paper
- Relays update
 - Canned models
 - Only have to do 1 model
- Talked about meeting with Normann F.
- Start thinking about how we will make a poster
- Meeting with Normann F. – invite Fred Jessop – Erin Jessop
 - Simulation
 - PPT
 - Pick his brain as to where to go
 - Formulate some questions in advance
 - Pictures of test today
 - Present the data instead of the ppt
 - Presentation of the meat of the project
 - What we got – agenda with papers – documents for everyone,ppt

- Documents – paper – videos – technical

Items to address

- **Snapshot day #2 GJ lab 8:30-10:20**
- 11/3-21 Design Review
- Design Review participation
- Team Member Citizenship Assessment

DFIG MINUTES

#9---11/18/2014

Discussed within meeting

- DFIG Test Today
 - Went over our methods and procedure for or DFIG tests
 - Provided Dr. Hess with our results
 - Power was off from Tim L's model
 - 2 watt meter method
 - A-b (clamp on A)
 - B-c (clamp on C)
 - One will be greater than 1/3
 - The second will be less (sometimes negative)
 - RE-RUN no load test
- T-line update
 - Ask sel what t-line model they would like to use?
 - Look at pu (calculate) should be the same
 - Series resistance should be smaller (1,2%)
 - Magnetizing should be greater

Items to address

- Design Review participation
 - Questions
 - As much us asking him as him asking us
 - Tell where we are
 - What we have done
 - Vision
 - Ours/yours
 - Where to go after
- Team Member Citizenship Assessment

DFIG MINUTES

#10---12/02/2014

Discussed within meeting

- Went Over our packet
 - Protection scheme can use existing products
- Mike may need help with controls
 - Ask Dr. Law for software?
- Make sure to refer to people during presentation
 - Don't want the presentation to seem like a one man show
- Might get asked about mike – who's doing what. How we are working together, we can help each other out.
 - Invite to the design review
- Be prepared when it will be finished
 - Revise timeline****
- BIN WU – Book available in library, grab a librarian and ask for the technical reference- models of various machines*
- Look at authors for parameters
- Ask Johnson if parameters are reasonable for T-line
 - OR Alaap
- How well we understand what we are doing*

Items to address

- Design Review participation
- Team Member Citizenship Assessment

DFIG MINUTES

#11---12/09/2014

Discussed within meeting

- Talked with Dr. Li about our Design Review
 - Went as planned
 - We will have the opportunity to have a ppt. for the technical report
 - Reasonable information
 - We should split up the presentation next time
 - The .ppt would be to catch others up on the topic.
 - If for the client only – technical
 - If for client + others – .ppt
- Snapshot went well
 - Had industry people, talk to us and polish up our presentations
- Talked about meeting up with Dr. Johnson and a class
- Wikipage today
- Portfolio and logbooks
- Normann stopped by and helped us edit the model
- Talked to Gregg
 - Can move the DFIG any time
- NO MEETING NEXT WEEK

Items to address

- Finish up
 - Logbook
 - Wikipage
 - Portfolio
 - Snapshot poster
- Get a room reserved for next semester meeting times.