Group number: 1706

Project title: Renewable Energies Lab

Client &/Advisor: Prof. Ajjarapu

Team Members/Role:
Leader: Travis Merrifield
Webmaster: Elika Korhonen
Communications: Noah Chartouni
Idea Holder: Josh Pachl & Steve Ukpan

- **Weekly Summary**

- **Past week accomplishments**

- **Individual contributions**

NAME	Hours this week	HOURS cumulative
Elika	9	17
Josh	7	15
Noah	7	9
Travis	8	14
Steve	7	12

- ○ **Elika:** Simulink modeling, circuit research and design. Worked with the team on finishing the boost and inverter model, tweaking it, and making it useful for future use.
- ○ **Josh:** Also tried to piece together a simulink design for the Booster circuit. Worked with the team to get a useful model implemented. Did reading on MPPT to try and understand how it works physically.
- ○ **Noah:** Researched and read through Boosters and Buck converters. Broke down design

of Boosters and Converters to try and understand what components perform what functions and figure out how these affect the whole circuit. Read through MPPT and looked at graphs who tried to look at curves and how they react in certain situations.

- ○ **Travis:** Started my own simulink design of the circuit and tried to absorb how simulink works. I then helped the team on the final design (AKA Elika's design). Worked with the team in understanding how MPPT works and why it is important.
- ○ **Steve:** Used simulink to design a rough circuit for the boost converter researched designs for the circuit. Researched more documents on MPPT and its implementation with a DC/DC converter

- ● **Comments and extended discussion**
  - ○ We believe that we are capable of understanding what information we need to know in order to complete our project. Communication with the professor on what topics we are expected to know and at what time, needs to be improved.

- ● **Plan for coming week**
  - ○ **Elika:** Study soar properties with the team to produce math based models both on paper and in simulink. We will work together Tuesday, Thursday, and Friday to solve relevant equations.
  - ○ **Josh:** The team and I will need to understand how the PV curve is derived from the circuit model of a solar cell and how the load effects this.Once this is done we must implement this into simulink.I personally will spend time doing calculations for continuous current in the DC-DC booster as well as what capacitance gives us low ripple and comparing those output waveforms. with other to better understand why we need those values. This will be done on Tuesday ,Thursday and Friday.
  - ○ **Noah:** Research with team the PV curves and find out more about the current component and how it relates to the characteristics of the curve. Work with team on finding the derivatives of the PV curve as well and how to model this in simulink. Will also work with Josh to perform calculations for ripple and how this relates to the capacitance value. We will do this towards the end of the week, most likely Friday. Work with team will be done Tuesday, Thursday.
  - ○ **Travis:** Work with the team on adding the PV cell model to the simulink design. I'll work on this Tuesday, Thursday and Friday afternoons.
  - ○ **Steve:** Get an algebraic understanding of IV & PV curve characteristics how to model

one of those curve in simulink also understand the calculations used to determine the duty cycle, ripple current. This will be accomplished Tuesday - Friday
- **Entire Team:** We need to add the PV source to the simulink design. When this is added, we need to play around with load values and see how that relates to current and voltage. We also need to do calculations to find minimum L and C values for continuous current in our design. If we have time we will try to implement MPPT in the design.

- **Summary of weekly advisor meeting (if applicable/optional)**

  Once again there was a miscommunication as to what Professor Ajjarapu expected us to present. This blame is accepted by Travis. Rather than giving an overview to MPPT and how it works, we wanted to directly apply that to a PV cell. We will have this prepared next week.

  We continued to show our progress on the simulink design. He was pleased with what we had accomplished. Next time he wants someone else to lead the presentation. This way it is evident that all members on the team have a strong understanding of what is going on. The presentation given next week is understood as deriving PV curves for PV cells this will give us more insight into how MPPT is working. We should also strive to have a decent simulink model of the system for next week although this may not be done. He also wants us to have a more long term plan of what we want to accomplish.