AIMS² Research Project in <type title of your project here>

Title of Project:	Modeling and Simulation of Electric Vehicles- Solar Energy-Battery systems
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Research Duration:	Fall 2020-Spring 2021

Modeling and Simulation of Electric Vehicles-Solar Energy-Battery systems

Just recently a new state of the art vehicle called Lucid air was tested by the Federal government. The manufacturer claims that a range of approximately 500 miles per battery charge is possible. Looking into some details of the technology used, the voltage claims to have a 900VDC powertrain and smaller motors.

The efficiency of the powertrain in an electric vehicle (EV) defines the efficiency of the electrical system. In this research, we propose to simulate and analyze the combined efficiency of the powertrain, battery and solar energy. We intend to focus in three separate research topics: First, powertrain, second, DC-DC converter, and third, battery storage. In addition, this research will use Simulink/ Matlab.

ONLINE RESEARCH: This project will be done online using CSUN Matlab/Simulink, and Databases provided by CSUN's library (IEEE-Xplorer, Elsevier, etc). All students have access to Simulink/Matlab via CSUN download.

Goals:

- 1. Literature research, and software installation (6 weeks)
- 2. Powertrain modeling with MATLAB/Simulink (6 weeks)
- 3. DC-DC converter modeling with MATLAB/Simulink (6 weeks)
- 4. Battery and Solar Energy (6 weeks)
- 5. Simulation with ADVISOR (6 weeks)

Outcomes:

- 1. Modeling/simulation of EV powertrain
- 2. Report in Microsoft word
- 3. Power Point presentation
- 4. IEEE-Template based research paper
- 5. Poster

The team for this research will be composed of three to four AIMS2 students. Those students are expected to work every week no more than 5 hours per week. Every week we will have a *mandatory meeting* via Zoom to show progress achieved, for each of the goals listed above working towards the intended outcomes. Towards the end of Spring 2021, students will finalize a word document report a technical paper related to their findings using the IEEE technical paper format as well as preparing a poster.

A google drive site will be set up for this project. On this site, students will have to identify their individual contributions by uploading relevant material and power point slides generated every week. Submissions meeting expectations for individual outcomes will be assessed. Students will get feedback for improvement from me during the weekly meeting. The group will use email messages for regular updates on their work.