SREE VIDYANIKETHAN ENGINEERING COLLEGE

(AUTONOMOUS)

Sree Sainath Nagar, Tirupati - 517102

Report on

An Industry Oriented Expert Lecture on

"Motor Control for Electric vehicles"

using MATLAB/SIMULINK

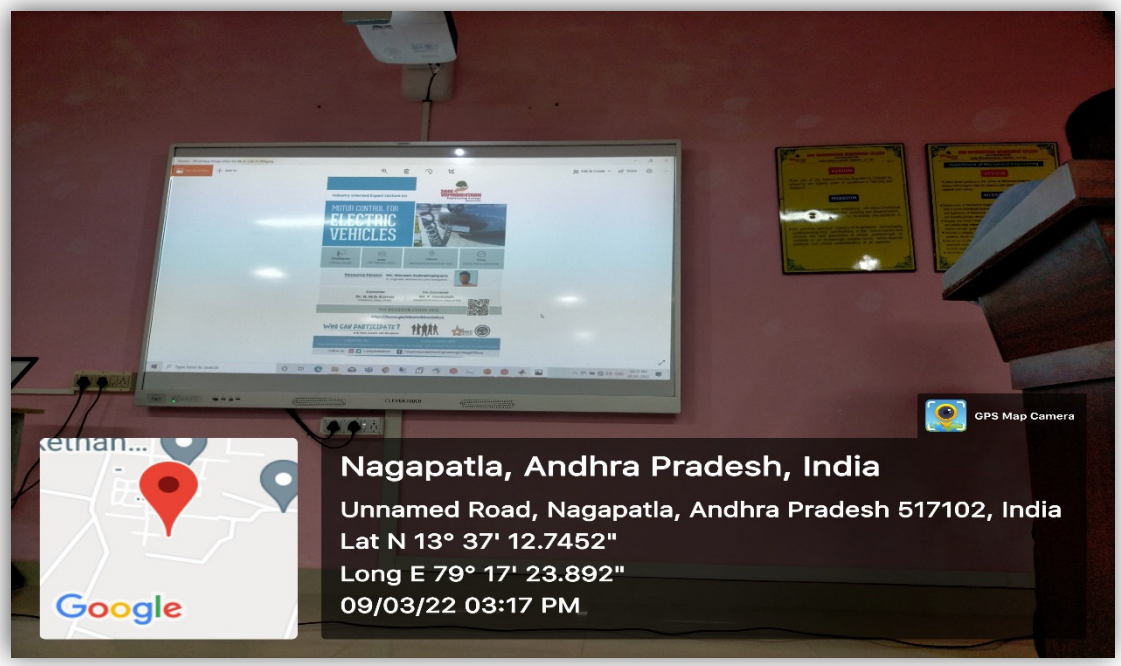
Under IEEE Student branch and ISTE Chapter

On

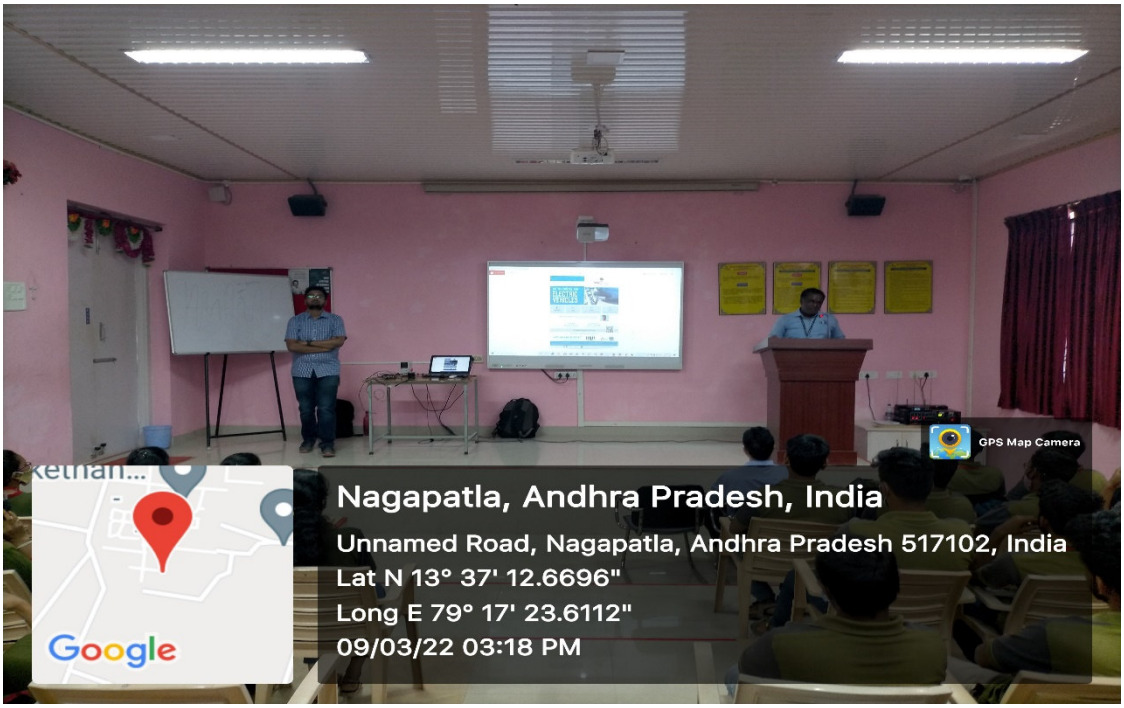
09th March, 2022. Time: 03:00 to 5:00PM

IEEE student branch and ISTE student Chapter of SVEC and Dept. Of EEE, Sree Vidyanikethan Engineering College was organized an industry expert lecture on **"Motor Control for Electric vehicles"** using MATLAB/SIMULINK held on 09th March 2022 at 03:00 to 5:00PM at Mechanical seminar hall for **III B. Tech. EEE, II Sem (C& D)** Students and faculty are participated. The objective of this industry oriented expert lecture is to facilitate the significance of the various motor controllers used in the modern transportation system based on electric vehicles. It was an excellent opportunity for students to access the high-quality expert lecture and possible Internship opportunities on available in the mathwork.com

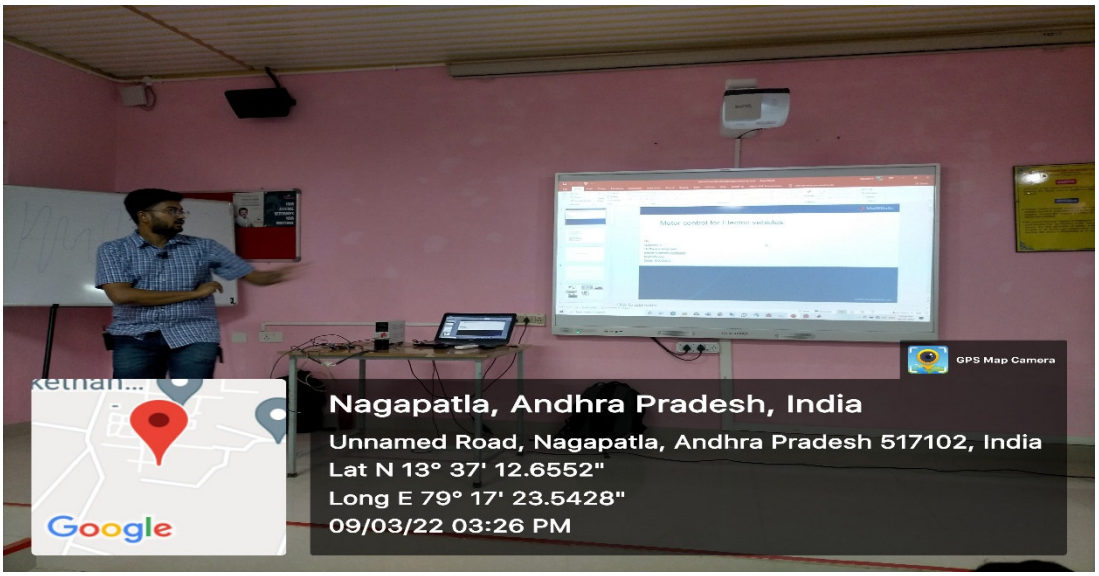
Boucher



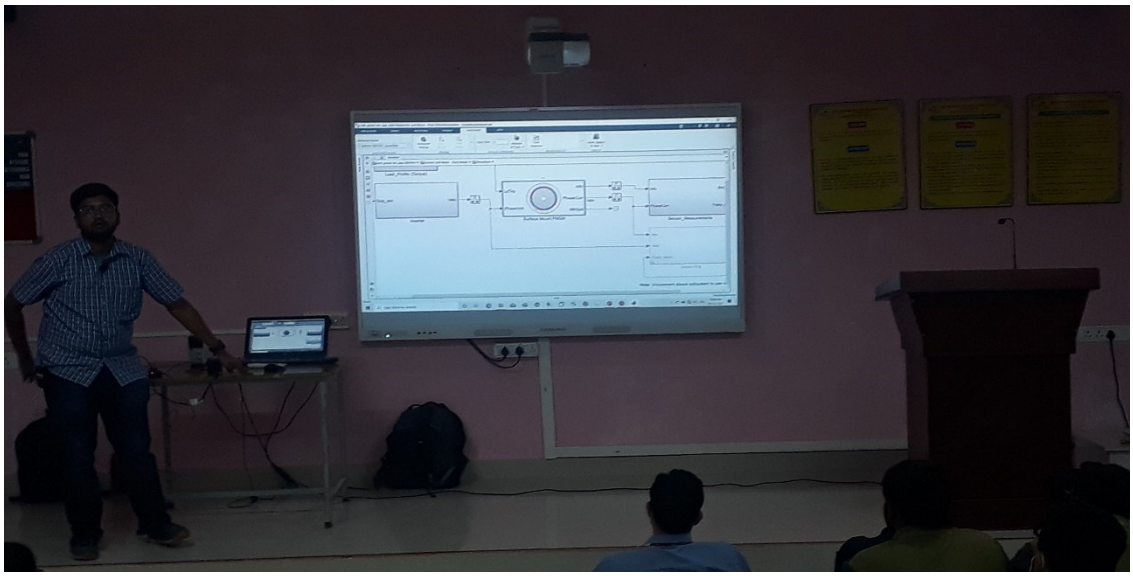
Banners for an Industry Oriented Expert Lecture on Motor Control for Electric vehicles using MATLAB/SIMULINK



Inaugural and welcome address by Dr. N M G Kumar for industry oriented expert lecture



Resource person addressing the Participants on Motor Control for Electric vehicles

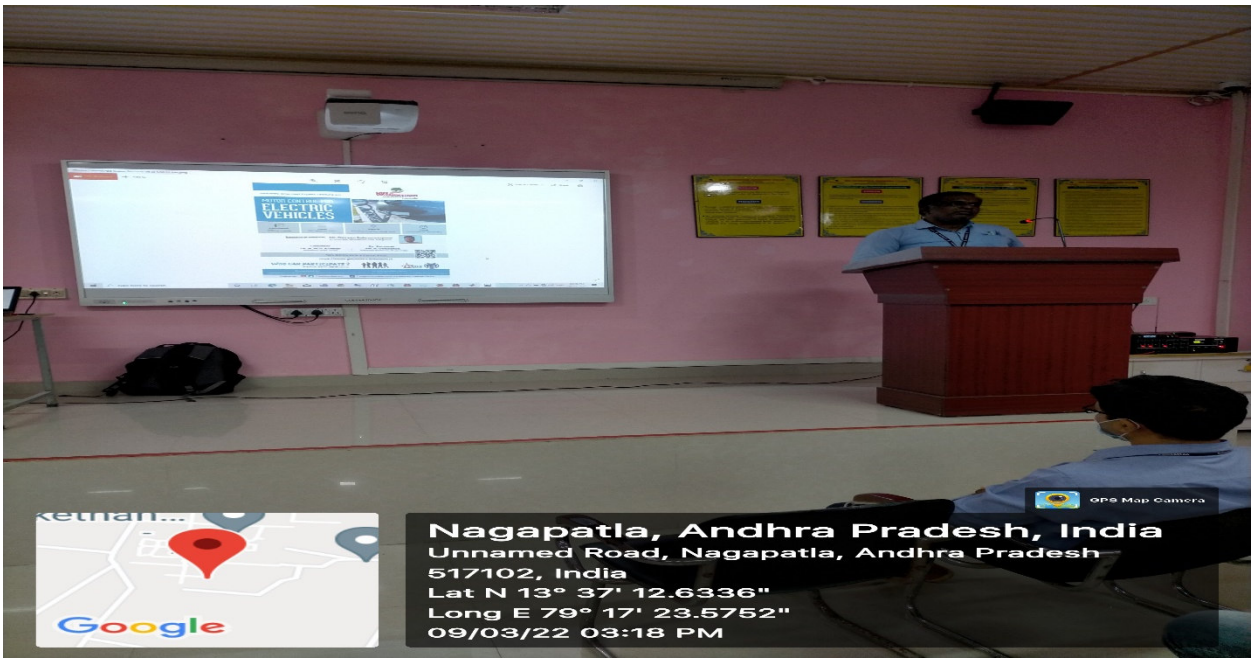


Resource person demonstrating participants with MATLAB/SIMULINK programing

Resource person Interacting participants and clearing the doubts

Resource person addressing the participants on motor control for electric vehicles

Resource person felicitating by Dr. S. Farook Professor with a memento



Dr. N M G kumar proposing vote of thanks to resource person and participants.

Profile Expert:

Naveen Subramanyam V

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Mobile: +91-9966203696

About me

Electrical engineer with Masters in Systems and control engineering. Areas of interest include Model predictive control, Advance motor control techniques and optimization. Currently working with Motor control blockset team, MathWorks, with in-Depth learning and hands-on experience on advanced Motor control algorithms.

Education

- **Indian Institute of Technology – Hyderabad** — Hyderabad, India
  Masters in Technology - Systems and Control engineering; GPA: 9.08 — *August 2017 - April 2019*
- **Sree Vidyanikethan College of Engineering – Tirupathi** — Tirupathi, India
  Bachelor of Technology - Electrical and Electronics Engineering; Percentage: 88 — *June 2013 - May 2017*

Skills Summary

- **Technical Skills**: Motor control algorithms for PMSM, Model predictive control, Optimal control, Validating motor control algorithms on Hardware and using PIL(Processor-in-Loop)
- **Languages**: MATLAB, Simulink, C++, C
- **Tools**: MATLAB
- **Soft Skills**: Fast and continuous learner, Event Management, In pursuit of continuous development via feedback, Self motivated

Experience

- **MathWorks** — Full time
  Software engineer in Test, Motor Control Block-set — *Sep 2020 - Present*
  - Day to day work includes testing of blocks/algorithms for motor control applications. Develop test strategies and procedures to make sure that the Motor control Block-set is bug free.
  - Develop utilities to improve the test infrastructure and guide interns on projects related to testing of motor control applications.
  - Delivered a shipping example alongside development team on FOC using Model Predictive control both in Simulation and on Hardware.
  - Currently building a Stand-alone application to control Motor on Hardware without the need of MATLAB.
- *Engineering Development Group* — *July 2019 - Aug 2020*
  - Day-to-day work of an EDGer includes working on wide variety of projects offered by the development teams and also Technical support team.
  - Worked on projects like FOC of PMSM motor and Dyno as part of Motor control blockset team, Modelling of Battery-pack using Simscape language, Application to convert plots (Example: Characteristics plot in image format) from the data sheet to a MATLAB usable format (.mat file similar to .xls file)
  - Worked on wide range of Technical support cases during support weeks and was also elected as a Group leader
  - Developed an Application to ease the process of the a Group leader in maintaining case-hygiene.

Academic Projects

- **Start-up using Model Predictive Control(Model Predictive control, Genetic algorithm**: To develop a controller for Start-up process using Model Predictive Control by formulating it as a Multi objective optimization problem using Genetic algorithm in MATLAB.
- **Multi-objective optimization using evolutionary algorithms (Optimization, Differential evolution)**: to develop a Multi-objective Differential evolution algorithm to optimize ZDT-6 function using MATLAB
- **Microprocessor based multi-functional relay (Embedded C, Ardiuno)**: To develop a relay that senses faults in multiple system parameters like Voltage, Current, Impedance and Frequency. Up-on detection of fault the user will be alerted using GSM

Honors and Awards

- Ideal student of Talent and Excellence from engineering colleges in Andhra Pradesh (A.P) and Telangana (T.S) for 2017 - ISTE – Student chapter A.P and T.S.
- Secured a rank of All India 930 in GATE-2017
- Won first prize in Paper presentation on 'Intermittency reduction in renewable energy sources using Vehicle to Grid system' in Sparx'16, National level Technical Fest held at Sri Venkateswara University, Tirupathi.

Volunteer Experience

- **Core Head - Technoholic, Mohana mantra**
  Lead a team of 120 as part of Technical events team in Mohana Mantra, a national level Techo-Cultural fest — *2015*
- **Volunteer - Technoholic, Mohana mantra**
  Worked as a volunteer to organize Poster presentation events as part of Mohana mantra — *2014*

Naveen Subramanyam V, Software engineer in Test, Motor Control Block-set, MathWorks, Bangalore, India, delivering a lecture on **"Motor Control for Electric vehicles using MATLAB/SIMULINK"**

Mr. Naveen Subramanyam V delivered an expert lecture on **"Motor Control for Electric vehicles using MATLAB/SIMULINK"** to **III B. Tech., EEE, II Sem**. Students on 9thmarch 2022 at Dasari auditorium during the period of 11.00am to 1.00pm. the resource person particularizes about the primary operational aspects of various motors used in the transportation system especially used in Electric vehicles in industry. His presentation mainly focuses on various components of motors and EV'S, assembly and control schemes adopted to control the speed on vehicles.

Permanent magnet synchronous motors (PMSM) are special type of brushless motors that offer advantages like high efficiency, high torque to weight ratio, high performance in both high and low speed of operation, and low maintenance over other motors. The implements the **field-oriented control (FOC) technique to control** the speed of a three-phase **AC induction motor (ACIM).** The FOC algorithm requires rotor speed feedback, which is obtained in this example by using a quadrature encoder sensor. Speed control of PMS motors is commonly achieved by employing **Proportional-Integral (PI)** controllers, the unmodeled highly nonlinear dynamics of disturbances, due to sudden and frequent load variations, makes the use of PI controllers unsuited. **Active Disturbance Rejection Control (ADRC)** algorithm is a suitable strategy as it offers better dynamic performance for any sudden changes in the load.

The Technical consideration for various operating conditions, Protection systems, safety precautions, and recommended IEEE and IEC standards for various levels for Motors. Some of the major merits and demerits of the various advanced insulated materials used in EV's. However, in certain applications like in treadmills, electric vehicles, lists, hoists appliances in space applications, industry automation, process control, cars and everywhere. He also explored the key concepts of communication technologies and data analytics used in the Motor Control for

Electric vehicles. Finally, the resource person emphasized the role of MATLAB/SIMULINK with hardware for motor control schemes used in the industry. He also emphasis on various carrier opportunities on modern days transportation systems. Around 100 B. Tech students from Electrical and Electronics Engineering benefitted with this industry expert lecturer.

Students & Faculty Practicing in industry oriented expert Lecture

IEEE Student Branch Counselor
Dr. N M GKUMAR