



IEEE - MVSR STUDENT BRANCH
Student Branch Code: 12161, School Code: 41329276



PDP on Process Development for On board charging Application for EVs

IEEE MVSR PES Student chapter in collaboration with Institution's Innovative Council (IIC) and Electrical Engineering Students Association conducted a PDP on the topic "Process development for onboard charging application for Electric Vehicles using Dual Active Bridge DC-DC Converter". The objective behind this program was to enrich the knowledge of students and faculty.

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Session Details:

Date: 21st December, 2020.

Time: 10 AM to 12 PM.

Number of Participants: 32.

Speaker for the session: Mr. A. Srinivasulu, M.Tech.

The webinar was commenced by Mr. Bharat Mohan, Assistant Professor, EEE Department, MVSREC. He explained the objective of the PDP and thanked the participants for registering. He invited Mrs. Sai Prasanna, Assistant Professor, EEE Department, MVSREC to sing the invocation song. Followed by this, Mr C.V.G.K. Rao, Head of the department, EEE, MVSREC was called upon to address the meeting. He stated the importance and significance of the topic and threw light on how this program will aid students to undertake research and project works. After this, Dr. D. Harikrishna, IEEE MVSr Student Branch Counsellor & IEEE, MVSr PES Student Chapter advisor, welcomed everyone and shared the idea behind this program. IEEE Membership renewal costs for the year 2021 were also brought to the notice of students by Dr. D. Harikrishna. Later the session was handed over to Mr. H. Srinivaslu, Speaker for the day.

The poster features logos for MVSr Engineering College, IEEE MVSr Student Branch, Institution's Innovation Council, Pantech, and IEEE PES. It details the event's title, date, time, speaker, and coordinators.

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IEEE MVSr Student Branch

INSTITUTION'S INNOVATION COUNCIL
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DEPARTMENT OF ELECTRICAL AND ELECTRONICS ORGANIZING PDP ON

"Process development for on board charging application for Electric vehicle using Dual Active Bridge dc-dc converter"

Date:21/12/2020, Time :10:00 A.M -12:00 P.M

Speaker

H.Srinivaslu, M.Tech

Objective:
The main objective of organizing PDP is to enhance the skills of Faculty and students towards the process innovation occurrence in Electric Vehicle during charging and discharging of batteries

Coordinators:

Mr.N.Bharat Mohan Asst.Prof,EEE Dept	Mr.Y.L.N.Rao,Asst.Prof,EEE Dept IIC,Dept Coordinator.	Mr.C.V.G.K.Rao, Co Assoc.Prof ,IIC President & Head EEE
Dr. D Hari Krishna IEEE MVSr SBC and PES advisor	Mr.G.Satyanarayana, Asst.Prof,EEE Dept,EESA Coordinator	

Poster for the event

Mr. Srinivaslu greeted the participants and thanked organisers for giving him this opportunity. He commenced by providing an overview of topic and briefly explained about the history of

electric vehicles and reasons behind the emergence of EVs in present era. He went on with the classification of Electric vehicles and categorized them according to voltage levels.

He also shared few startling facts and predictions about EVs, few of them are,

- 1) In a EV which is purely run by Battery, the weight of the battery constitutes about 33% of the total weight of the vehicle.
- 2) If India can shift completely toward electric vehicles by 2030 then it can save about 20 lakh crores.
- 3) Tesla cars are the most luxurious cars in United States Overtaking its counterparts.

He also brought to notice that Government of India is encouraging the use of EVs and is also ready to fund innovative projects in this arena. Mr. Srinivaslu then went out to describe about high power drives and quoted some examples about different types of motors used. Based on the power required to drive the vehicle some companies are preferring multiphase drives as they can provide high power density and high speeds and also provided the details about classification of drives in Hybrid Electric vehicles. He gave a description about the major components used in Battery Electric Vehicles which include battery pack, traction inverter, traction motor, on board charger and DC-DC converter. He also pointed out the reasons why lithium ion batteries are expensive compared to other batteries.

The screenshot shows a Zoom meeting interface. The main content is a presentation slide titled "Main components of Full Electric Vehicle (BEV)". The slide lists the following components:

- Battery pack.(400-800V)
- Traction Inverter (~100kW)
- Traction Motor.
- On Board Charger (3.3kW/11kW)
- DC-DC converter (~3kW)
- BMS (Internal to battery)

The slide also includes a diagram of a car with numbered callouts (1-10) pointing to various internal components. The callouts are:

1. Charger
2. Batteries
3. On Board Charger
4. PHEVs
5. Motor
6. Transmission
7. Main Contactors
8. Instrumentation
9. Emergency Disconnect
10. DC/DC Converter

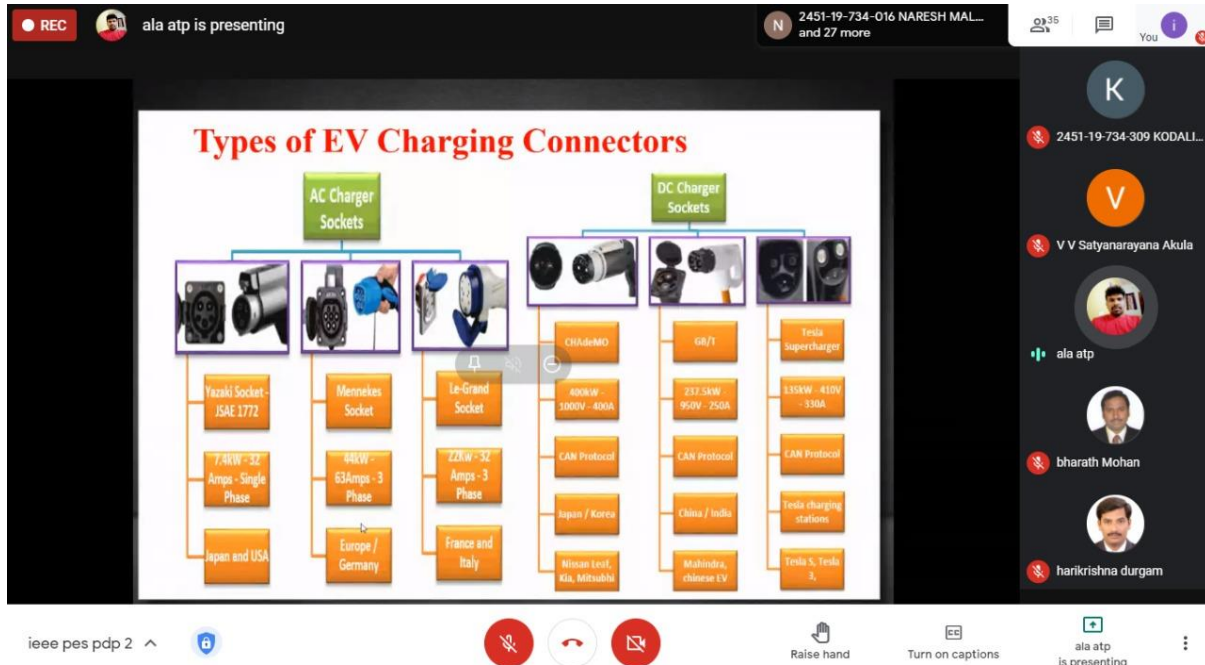
The Zoom interface shows the presenter's name "ala atp is presenting" and a list of participants including "2451-19-734-309 KODALL...", "harikrishna durgam", "V V Satyanarayana Akula", "ala atp", and "bharath Mohan".

Major Components used in Electric Vehicle

He elucidated type of chargers which are as follows: Level 1: It sends 15A current and takes 20 hours to charge a battery to its full capacity. Level 2: it sends 40 A and takes 7 hours for full charging. DC fast charging: It sends 125A and takes 30 mins for full charging. Followed by this Mr. Srinivaslu depicted about different types of EV charging connectors with the help of tree diagram. Afterwards he threw light on different modes of on board chargers which include Grid to vehicle mode (G2V), Vehicle to grid mode (V2G) and Vehicle to load mode (V2L).

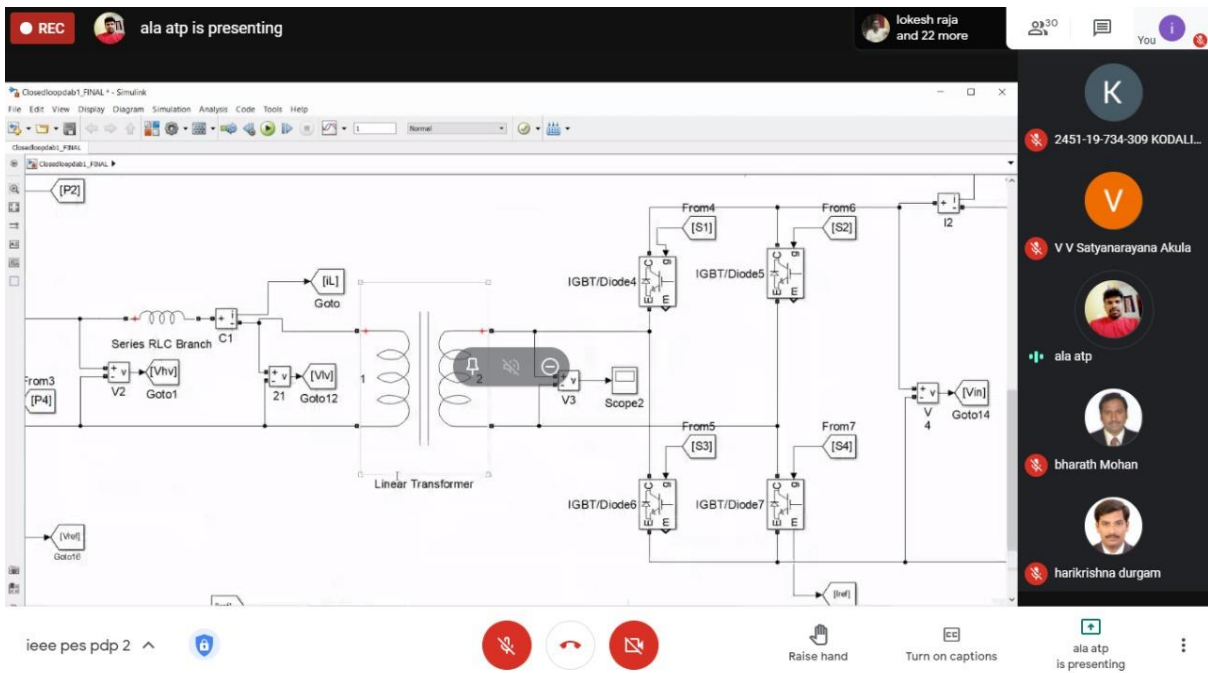
The next topic expounded was DC-DC converters. He stated that converters are classified into Isolated and Non Isolated DC-DC Converters. These converters are used to power up low voltage electronic clusters, ECU's, power steering, body control ECU etc. In non isolated

converters power is transferred from source to load using a small DC link path. Examples of this converter are buck, boost, buck-boost converter. In isolated converters power is transferred from source to load using an isolated transformer or linear transformer. These converters are used in high power applications. Examples include flyback, cuk, forward and dual active bridge converters.



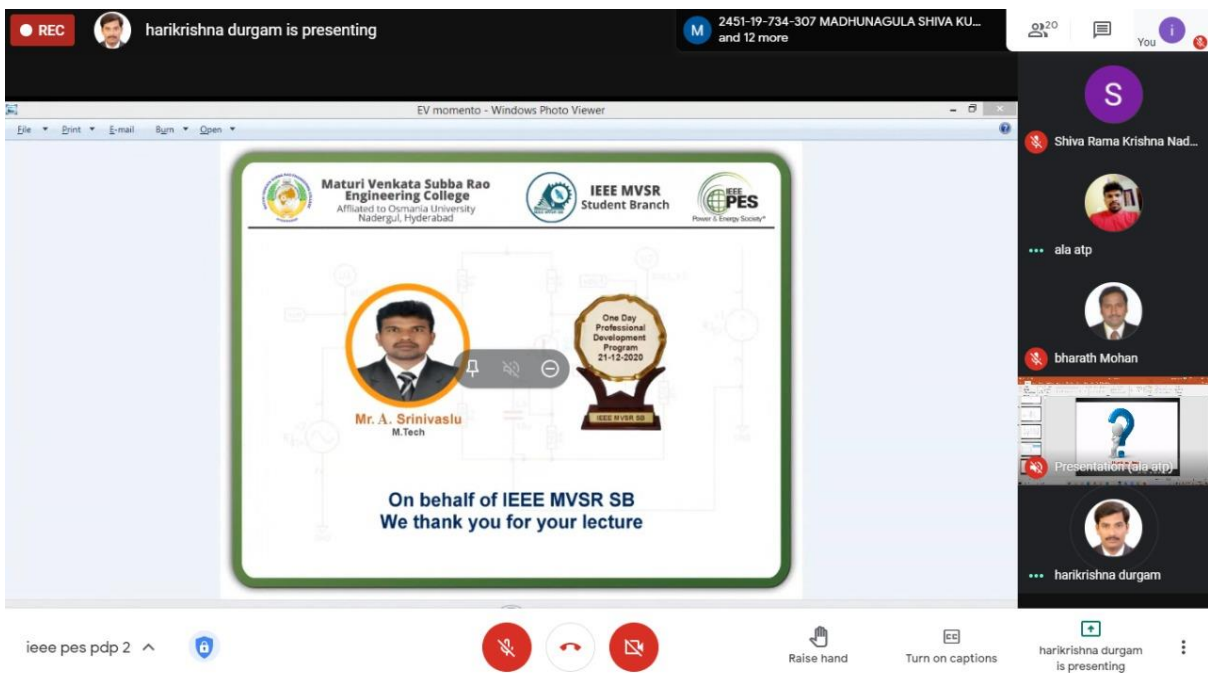
Tree Diagram representing Type of Charging Connectors

Followed by this Speaker illustrated about the control strategies used in DC-DC converters. He showcased the technologies which drive on board chargers and DC-DC converters. Most on board chargers are based on isolated DC-DC converters. He then drew comparison between isolated LLC resonant DC-DC converters and phase shifted dual active bridge converter and their operating conditions. Applications, Pros and cons of non-isolated dc-dc converter were also presented. Subsequently, speaker gave insights about switches used in converters and compared IGBT and MOSFET and stated that final call on which type of switch to be used should be taken based on design and application.



Circuit Diagram of Dual Active Bridge DC-DC Converter

Mr. Srinivasulu took the aid of simulink and briefed about the construction of circuit. Single phase shift technique was used and waveforms were plotted in simulink and compared with ideal characteristics. He concluded his talk by presenting new trends in progress which include fast charging, wireless charging, efficiency of conversion and safety of Electric Vehicles and Areas of work which would enhance the productivity of electric Vehicles.



Later speaker cleared the queries raised by the participants. Virtual momento by Dr. D. Harikrishna, Student Branch Counsellor, IEEE MVSR SB was presented to the speaker. Vote of thanks by B.Nikita Reddy, Chairperson, IEEE MVSR PES chapter, marked the end of the event.

Reported By:
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