



**ELECTRIC VEHICLE WIRELESS CHARGING
SYSTEM USING BIDIRECTIONAL CONVERTER
A PROJECT REPORT**

Submitted by

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in partial fulfillment for the award of the degree

of

BACHELOR OF ENGINEERING

in

ELECTRICAL AND ELECTRONICS ENGINEERING

T.J.S. ENGINEERING COLLEGE, PERUVOYAL

ANNA UNIVERSITY : CHENNAI 600 025

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T.J.S. ENGINEERING COLLEGE
Peruvoyal, Kavaraipettai,
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BONAFIDE CERTIFICATE

Certified that this project report "ELECTRIC VEHICLE WIRELESS CHARGING SYSTEM USING BIDIRECTIONAL CONVERTER" is the bonafide work of the following students.

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who carried out the project work under my supervision.


SIGNATURE

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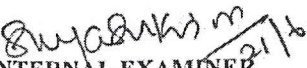
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INTERNAL EXAMINER


EXTERNAL EXMINER





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ABSTRACT

The transfer of energy from a source to a receiver has traditionally necessitated the use of a physical connection. Indeed, electrical grids and power outlets span nearly the entire globe and deliver power to billions of people worldwide. Recently, there has been much interest into the area of wireless power transfer (WPT), that is, the transmission of power without the need for a

WPT is an extremely useful technology that has numerous applications and benefits. Cell phones, laptops and other mobile devices could function without ever having to be plugged in, cars could drive on highways burning no fossil fuels; wireless power even has the potential to solve much of the renewable energy issues we face.

Wireless power transfer (WPT) can transmit electrical energy through a relatively large air gap. It shows the advantages of flexibility, convenience, and safety. Most of the disadvantages of conductive power transfer can be overcome or diminished by using this new technology. WPT can be employed in many applications such as electric vehicles, automatic underwater vehicles, and ~~replacable~~ medical devices. To expand the load lifetime and achieve better performance, the output voltage/current of a WPT system should be stable.




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OBJECTIVES:

To impart knowledge on the following Topics

- Different types of power semiconductor devices and their switching
- Operation, characteristics and performance parameters of controlled rectifiers
- Operation, switching techniques and basics topologies of DC-DC switching regulators.
- Different modulation techniques of pulse width modulated inverters and to understand harmonic reduction methods.
- Operation of AC voltage controller and various configurations.

UNIT I	POWER SEMI-CONDUCTOR DEVICES	9
Study of switching devices, SCR, TRIAC, GTO, BJT, MOSFET, IGBT and IGCT- Static characteristics: SCR, MOSFET and IGBT --Triggering and commutation circuit for SCR- Introduction to Driver and snubber circuits.		
UNIT II	PHASE-CONTROLLED CONVERTERS	9
2-pulse, 3-pulse and 6-pulse converters- performance parameters -Effect of source inductance- Firing Schemes for converter-Dual converters, Applications-light dimmer, Excitation system, Solar PV systems.		
UNIT III	DC TO DC CONVERTERS	9
Step-down and step-up chopper-control strategy- Introduction to types of choppers-A, B, C, D and E Switched mode regulators- Buck, Boost, Buck- Boost regulator, Introduction to Resonant Converters, Applications-Battery operated vehicles.		
UNIT IV	INVERTERS	9
Single phase and three phase voltage source inverters (both 120° mode and 180° mode)-Voltage & harmonic control--PWM techniques: Multiple PWM, Sinusoidal PWM, modified sinusoidal PWM - Introduction to space vector modulation -Current source inverter, Applications-Induction heating, UPS.		
UNIT V	AC TO AC CONVERTERS	9
Single phase and Three phase AC voltage controllers-Control strategy- Power Factor Control - Multistage sequence control single phase and three phase cyclo converters - Introduction to Matrix converters, Applications -welding		

TOTAL : 45 PERIODS




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OUTCOMES:

- Ability to analyse AC-AC and DC-DC and DC-AC converters.
- Ability to choose the converters for real time applications.

TEXT BOOKS:

1. M.H. Rashid, 'Power Electronics: Circuits, Devices and Applications', Pearson Education, Third Edition, New Delhi, 2004.
2. P.S.Bimbra "Power Electronics" Khanna Publishers, third Edition, 2003.
3. Asnfaq Ahmed "Power Electronics for Technology", Pearson Education, Indian reprint, 2003.

REFERENCES

1. Joseph Vithayathil, 'Power Electronics, Principles and Applications', McGraw Hill Series, 6th Reprint, 2013.
2. Philip T. Krein, "Elements of Power Electronics" Oxford University Press, 2004 Edition.
3. L. Umanand, "Power Electronics Essentials and Applications", Wiley, 2010.
4. Ned Mohan Tore. M. Undel and, William. P. Robbins, 'Power Electronics: Converters, Applications and Design', John Wiley and sons, third edition, 2003.
5. S.Rama Reddy, 'Fundamentals of Power Electronics', Narosa Publications, 2014.
6. M.D. Singh and K.B. Khanchandani, "Power Electronics," Mc Graw Hill India, 2013.
7. JP Agarwal, "Power Electronic Systems: Theory and Design" 1e, Pearson Education, 2002.



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