

Remote Power Transmission Utilizing Class E-power Amplifying Device from Solar Input

Jeffin James, R. Dhinesh, S. Balaji, J. Ajay Daniel

Abstract--- *The electrical power transmission from the source to goal happens with no utilization of wires is known as remote power transmission. Copper links and directing wires are dispensed with for remote exchange of electrical vitality. Remote power transmission (WPT) has a wide scope of utilizations like charging of electric vehicles, Hybrid autos, electronic gadgets and so on. Prior exchange of remote power has been accomplished for charged batteries or AC source. In this paper the yield from the sun oriented board is taken as the contribution to the framework. DC-DC venture up converter is been utilized since the sun based boards yield is little it must be ventured up to fitting qualities. The ventured up dc voltage is given to the class-E speaker and after that changed over into high recurrence swaying signal. This flag is further remotely exchanged utilizing a transformer. By accomplishing great attractive coupling that exists between the exchange setup that is transmitter and recipient coil the power is been exchanged. Later the extension rectifier circuit changes over the wavering sign into DC before it is encouraged to the load.*

Keywords--- *Solar, DC-DC Converter, Power Transmission, Wireless, Load.*

I. INTRODUCTION

The way toward transmitting electrical power starting with one spot then onto the next with no directing links is called remote power transmission. By the utilization of this innovation transmission of electrical vitality to remote regions without wires is conceivable. This can be utilized for applications where either a momentary sum or a ceaseless conveyance of vitality is required, yet where regular wires are unreasonably expensive, badly designed, costly, dangerous, undesirable or unimaginable. Nikola Tesla exhibited transmission of electrical vitality without wires in mid nineteenth century by imagining Tesla loop, which was utilized to exchange control remotely utilizing radiative technique. The energy can be transferred by utilizing Inductive coupling for short range, Resonant Induction for mid-extend and Electromagnetic wave control exchange for high range. WPT is an innovation that can transport capacity to areas, which are generally unrealistic or unreasonable to reach. Charging low power gadgets and mid power gadgets by methods for inductive coupling could be the following enormous thing. Remote power transmission for two meters of separation for 60 watt power with 60cm loop breadth was

effectively done by MIT specialist's group. Also accomplished 40% productivity.

II. METHODS OF REMOTE POWER TRANSMISSION

2.1 Induction (Inductive Coupling)

This mode is the utilization of attractive coupling which typically happens in transformers. There are two loops transmitting and accepting curls and power is exchanged because of common coupling. This mode is extensively characterized in to short range and midrange. Short range demonstrated great effectiveness and separation of transmission is restricted and for midrange transmission remove is all the more however less proficient.

2.2 Electrical Resonance Mode

It is advance technique for inductive coupling alongside reverberation which demonstrated great proficiency contrasted with enlistment mode. The mode is accomplished by resounding transmitter and beneficiary curl for a specific recurrence and power is exchanged. The curls itself goes about as inductors and by simply connecting capacitance plate reverberation can be accomplished. We can utilize solenoid with capacitor plates put intently.

2.3 Radio Waving and Microwaving

To beat the downsides of enlistment mode and electrical reverberation method of remote power transmission and to accomplish over a long separation transmission YAGI innovator from JAPAN created YAGI ANTENNA which is directional cluster reception apparatus used to transmit control utilizing Radio wave. It is additionally improved by power radiating by utilizing Micro wave. In which DC control is changed over into microwaves by RECTENNA at the transmitting end and utilizing same reception apparatus at receiving end. Microwave is changed over into electrical power. Rectenna is most appropriate to get light emission from sunlight based boards which are in geocentric circle and fundamental safeguards are taken to counteract damage to humanity and condition. Rectenna is a variety of dipole comprising of positive and negative posts associate with semiconductor diodes. The radio wire turned out to be proficient up to 95%.

III. BLOCK DIAGRAM

Fig 1 demonstrates the square outline of the remote Power Transmission System model. It comprises of a solar panel which will be utilized as an input source, whose input voltage will be boosted utilizing a high step up DC-DC converter.

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This high voltage is then changed over high recurrence AC utilizing class E power amplifiers. The wavering signs are then fed into the transmitter setup. By accomplishing legitimate reverberation coupling between the transmitter and the beneficiary setup control gets exchanged remotely.

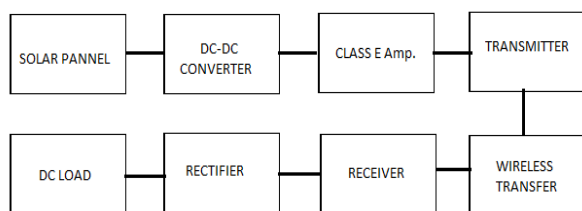


Fig. 1: Block graph of the proposed remote power transmission framework

IV. DESCRIPTION OF THE PROPOSED WIRELESS POWER TRANSMISSION SYSTEM

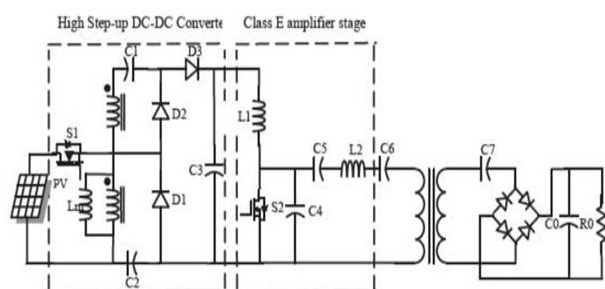


Fig. 2: Circuit configuration of the designed wireless power transmission system

The fig 2 demonstrates the two principle phases of the proposed framework. The primary stage is the high step up dc-dc converter which changes over the low info voltage from the PV Cell to a higher esteem. The step up converter has following points of interest: I. The converter has a high step up change proportion as a result of the association of the coupled inductors, diodes and the capacitors. II. It has extremely high proficiency and lower weight on the switches as the spillage inductor vitality can be reused. It comprises of a coupled inductor T1 with the switch S1. The essential side twisting N1 of a coupled inductor T1 is indistinguishable to the input inductor of the traditional boost converter, and diode D1, capacitor C1 gets spillage inductor vitality from N1. The auxiliary side twisting N2 of coupled inductor T1 is associated with another pair of diode D2 and capacitors C2, which are in arrangement with N1 so as to build the lift voltage. The rectifier diode D3 is associated with yield capacitor C3. The second stage is the class E intensifier which gets the dc contribution from the high step up converter and changes over to high recurrence air conditioning. The class E intensifier is a high productive switch mode thunderous converter. The high proficiency results from the decreased power misfortunes in the transistor. The higher productivity of the switch can be accomplished by: I. Utilizing the transistor as a change to decrease the power II. Diminishing the exchanging misfortunes which result from limited progress time among ON and OFF conditions of the transistor. The Class E

speaker comprises of a RF stiffler L1 and a parallel-arrangement resonator circuit comprising of C4, C5 and L2. The yield of the class E control intensifier is associated with the tank circuit shaped by C6 and the transmitting coil as appeared in the fig 2. The collector comprises of a tank circuit framed by capacitor C7 and the getting curl and a basic full extension diode rectifier to change over the air conditioner control transmitted from the transmitter loop to dc and a channel C0 is utilized to diminish the music and after that given to the heap R0. The power gets exchanged full recurrence is accomplished among transmitter and collector pair.

V. DESIGN OF THE PROPOSED WIRELESS POWER TRANSMISSION SYSTEM

The plan of the proposed WPT framework requires the structure of the high advance up dc-dc converter and the structure of the class E control intensifier. Thus, there are two plan stages which will be examined in this segment. Amid the structure method, following presumptions are made:

1. All the parts are thought to be faultless.
2. The ON state obstruction and the parasitic capacitance of the switches are dismissed.
3. The voltage drops over the diodes are ignored. IV. The capacitors are expected to have a substantial esteem.

VI. SIMULATION AND RESULTS

The details of different parts utilized in the proposed model are mentioned in Table. 1. The simulation of the proposed remote power transmission display has been completed utilizing MATLAB/SIMULINK.

The proposed model has been confirmed for an input voltage of 12V from the sunlight based board and the yield is gotten to be 110V.

Table 1: Parameters of the Simulation Circuit

SI. No	Parameter	Value
1	Lm	15 μ H
2	C1	47 μ F
3	C2	47 μ F
4	C3	470 μ F
5	Duty ratio of s1	48.5%
6	Duty ratio of t1	2%
7	L1	80 μ H
8	L2	0.8 μ H
9	C4	690PF
10	C5	132PF
11	C6	150PF
12	C0	68 μ F
13	R0	400 Ω
14	Duty ratio of s2	50%

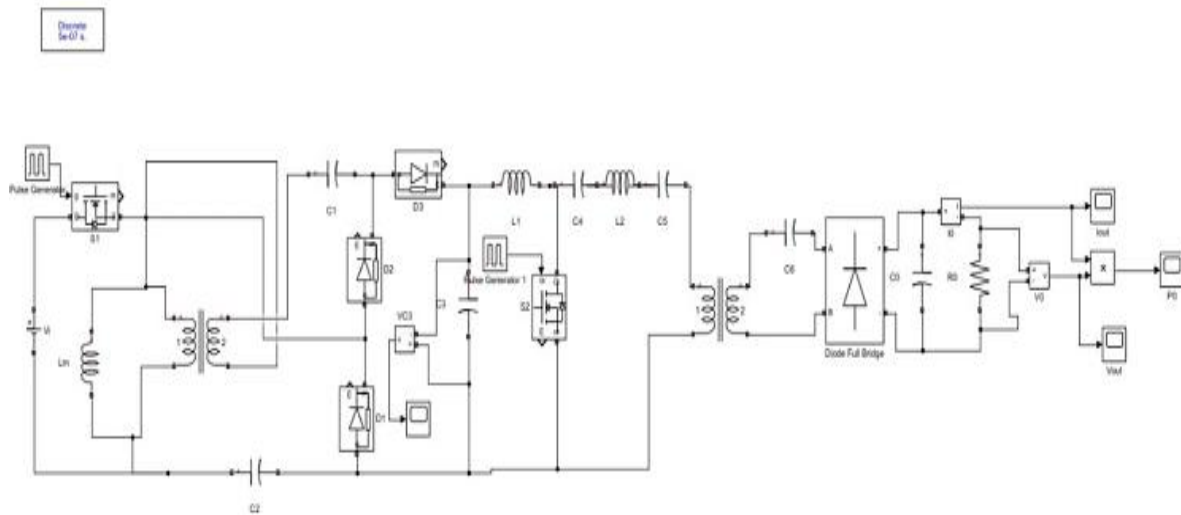


Fig. 3: Circuit arrangement of the proposed remote power transmission framework using simulation

VII. RESULTS

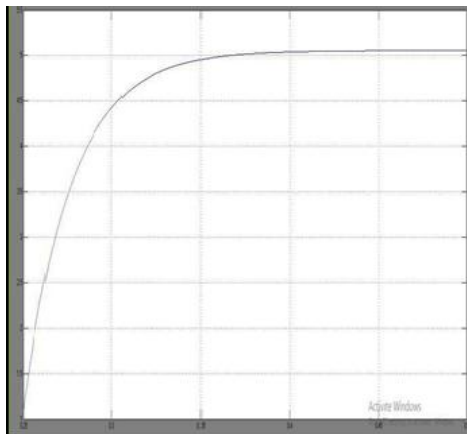


Fig. 4(a): Output current of the proposed system

The fig 4(a) represents the output current flowing through the secondary side of the proposed remote power transmission model itsobserved that the output current flowing through the proposed remote transmission model is found to be 250 mA

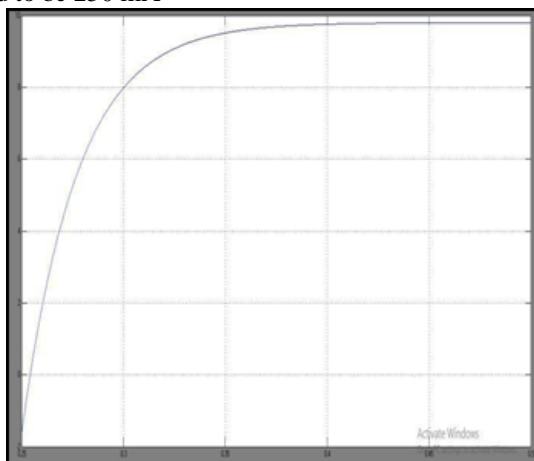


Fig 4(b): Output voltage of the proposed system

The fig4(b) is the plot of output voltage versus time with voltage on Y-axis in volts and time along X-axis in seconds .it is observed that output voltage at the secondary of the remote power transmission model is found to be 110V.

VIII. CONCLUSION

This undertaking has presented the transmission of power remotely utilizing the contribution from the sun based board. The proposed remote power transmission utilizing high step up dc-dc converter for PV cells has been assembled dependent on the simulation performed on MATLAB/SIMULINK. The model uses theconverter, the contribution of 12V has been ventured up to 70V which is the given as the contribution to the class E transmitter. The auxiliary or the beneficiary of the proposed model gets a DC yield of 110V and the power conveyed to the load is about 28W.

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